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Compensation Fund Set for Newsprint Mills

Canadian Government Issues Order Dealing With Mobilization of The Industry Under Government Control—Schedule of Contributing Mills and Amount Required by Each for Compensation Fund.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., February 22, 1943 — The first concrete demonstration of how the newsprint industry's compensation fund works out is given in an Order-in-Council dealing with the mobilization of the industry under direct government control.

The order includes a schedule of payments to be paid into a trust fund by certain companies whose production has been increased and benefits to be paid from the fund to companies whose production has been curtailed.

The payments listed in the order as in respect to the period September to December, 1942, inclusive, and are preliminary.

Highest Payment By Abitibi Co.

Highest payment into the fund is required from Abitibi Power and Paper Company, Ltd., $375,126. Largest amount in a schedule of disbursements is to Ontario Paper Company, Ltd., of Thorold, Ont., $381,518.

The order-in-council consolidates previous orders of the Prices Board newsprint administration.

It requires manufacturers of newsprint to place their manufacturing facilities at the disposal of the government and to make specified payments into the compensation fund.

The schedule of contributions to be paid into the fund is as follows:

Schedule of Contributing Mills

Abitibi Power and Paper Company, Ltd., $375,126; Anglo-Canadian Pulp and Paper Mills, Ltd., $16,670; Canadian International Paper Company, $190,252; Donnacona Paper Company, Ltd., $8,428; Donohue Bros., Ltd., $3,755; E. B. Eddy Company, Ltd., $164; Great Lakes Paper Company, Ltd., $231,301; James MacLaren Company, Ltd., $132,673; Mersey Paper Company, Ltd., $58,763; Ontario-Minnesota Pulp and Paper Company, Ltd., $146,992; Provincial Paper, Ltd., $3,008; Quebec North Shore Paper Company, $121,657; St. Lawrence Paper Mills Company, Ltd., $53,158; St. Raymond Paper Ltd., $5,982; Spruce Falls Power and Paper Company, Ltd., $192,593.

Disbursements from the fund are to be as follows: Bathurst Power and Paper Company, Ltd., $2,394; Beaver Wood Fibre Company, Ltd., $44,600; J. R. Booth, Ltd., $553; Brompton Pulp and Paper Company, Ltd., $3,036; Consolidated Paper Corporation, Ltd., $257,326; Lake St. John Power and Paper Company, Ltd., $172,596; Ontario Paper Company, Ltd., $381,518; Pacific Mills, Ltd., $61,560; Powell River Company, Ltd., $106,474; Price Bros. and Company, Ltd., $211,479. The compensation fund will be administered by the Commodity Prices Stabilization Corp., a branch of the Prices Board.

Mills Subject to Government Orders

The order requires that "each manufacturer is to place his manufacturing facilities at the disposal of His Majesty in that each manufacturer is assigned an established percentage of the total production of newsprint in Canada and in the event of a manufacturer being in fact allowed or directed to produce newsprint in any month in excess of its established percentage, it was provided that the manufacturer should remit to a trust fund established for the purpose a sum to be determined by the Newsprint Administrator, out of which fund payments would be made to manufacturers falling short of their established percentages."

Adam K. Luke is Chairman for Paper

Serving under the chairmanship of Charles A. Tattersall, vice-president of the Niagara Hudson Power Corporation, the leaders of eleven major industries have banded together to create the ninth section of the Commerce and Industry Committee, 1943 Red Cross War Fund of New York City.

During the ensuing weeks, the chairmen of the eleven divisions embraced in Mr. Tattersall's section will complete the formation of 45 sub-divisions and 66 committees whose members will organize hundreds of business executives and employees behind the $13,000,000 War Fund campaign which opens on March 1. The chairman for the paper industry is Adam K. Luke, vice-president of West Virginia Pulp and Paper Company.

Bill Would Regulate Logging Practices

Measure Introduced in Wisconsin Legislature Preferred by Pulp Mill Operators to Federal Control—Hearings Expected Soon—Tomahawk Co. Will Expand Sulphite Pulp Output—Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 23, 1943 — Regulation of logging practices in Wisconsin forests is on the way through bill 132-A, introduced in the Wisconsin Legislature by Assemblyman Charles Collar of Milwaukee. The measure is the outgrowth of numerous conferences held by the Wisconsin Conservation Commission with paper mill foresters, timber operators and others to stop the denuding of forests to meet the war demands.

Voluntary practices of selective cutting already have been placed in effect, principally in pulpwood obtained by the paper mills, but the Collar bill provides that mandatory regulations be set up by the conservation commission, with ability to enforce them. Where private forests are operated, such as those of the Nekoosa-Edwards Paper Company, the Tomahawk Kraft Paper Company and the Consolidated Water Power and Paper Company, the commission will be permitted to approve any plan of logging or "forest management" made by the landowners.

In the past, the pulp mill operators have favored federal regulation so as to avoid economic differentials in various states, but have swung around to the idea of state regulation because of the increasing bureaucratic control in Washington, with the overlording tendencies and stifling of private initiative.

Hearings are expected to be called soon on the Wisconsin measure.

Bill Would Repay Counties

In the Legislature's deficiency appropriation bill is an item of $45,000 with which to repay counties in full at 10 cents per acre for lands entered under the state forest crop law. The bill has been approved by the Assembly and is now before the Senate.

The state has promised the counties a full 10 cents per acre on lands set aside for forestry purposes, with an additional ten cents to be taxed against the owners. A severance tax is paid on the marketable value when timber is cut. Payments to the counties had been cut to 7.3 cents per acre as an economy measure, but the author of the appropriation, Assemblyman Arthur A. Lenroot, Jr., Superior, said he could see no reason why the state should not meet its full obligation.

As a means of helping timber buyers to locate additional wood, the college of agriculture at the University of Wisconsin has set up a committee to make surveys and bring buyers in contact with those who have available timber. F. B. Trenk, extension forester of the university, will act as secretary of the committee. The committee intends to seek out farmers with woodlots who have marketable timber, and notify buyers it is available.

Tomahawk Co To Make More Sulphite

Improvements in progress at the Tomahawk Pulp Company, Tomahawk, Wis., will increase the mill's capacity from 40 to 55 tons of sulphite pulp, according to announcement of C. J. Bronsted, general manager.

A new water turbine is being installed to produce an additional 1,200 H. P. A new Imco round screen and other equipment are being added.

The changes were made necessary by the government's increasing demand for sulphite pulp for use in munitions, and also to increase the amount of groundwood pulp available for commercial customers.

All of the mill's 1943 output has been contracted for, Mr. Bronsted says.

Dr. Myers Addresses Chemists

Dr. Robert J. Myers of the Resinous Products and Chemical Company, Philadelphia, spoke at a meeting of the Northeast Wisconsin section of the American Chemical Society Friday evening of last week at Lawrence College, Appleton, Wis. His subject was "Synthetic Resin Ion-Exchanges and the Purification and Softening of Water."

Marinette Employees Hold Meeting

Employees of the Marinette Paper Company, Marinette, Wis., held a meeting February 16 at the Labor Hall at Marinette, at which Rasmus Anderson, international representative of the Pulp and Sulphite Workers, was the speaker.

Students of Paper Institute Have Dance

The students and faculty of the Institute of Paper Chemistry, Appleton, Wis., held a formal dance at Castle hall February 13. It was in the nature of a farewell for students who are leaving soon to join the armed forces. Forty couples were present. The committee in charge included Frederick Schelhorn, Glenside, Pa.; Paul Hansen, Yakima, Wash.; Victor Burstein, Neenah, Wis., and Charles Sigvardt, Great Falls, Mont.

Book Publishers Discuss Curtailment

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 24, 1943—Methods of absorbing an indicated further curtailment in supplies of printing papers were discussed at a meeting of the Book Publishing and Manufacturing Industry Advisory Committee in Washington February 19.

E. W. Palmer, Deputy Director of the Printing and Publishing Division of the War Production Board, was Government Presiding Officer and took under advisement a suggestion, approved in principle by the committee, for meeting a further curtailment in the consumption of printing papers by expansion of the "across-the-board" percentage restrictions of Limitation Order L-245, governing paper put into process.

An analysis of interpretation problems, "borderline" cases and probable amendments of Order L-245 to improve controls was presented by Harry F. West, Chief of the Book Section of the Printing and Publishing Division of WPB.

Paper Demand Continues Heavy in Midwest

Orders for Many Grades Reflect Strong Paper Market — Book Paper Sales Heavy with Sulphite and Kraft Active—Waste Materials Men Unite on Wage Requests—Paper Man Heads Tax Reform.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., February 24, 1943—The Chicago paper market went into the third week of February with indications that the feverish buying now prevalent would last at least for the first quarter of 1943. There were no signs of any abatement as order backlogs continued to increase. Recent publicity from New York and from Washington as to government pulp requirements only served to accentuate the tightness of the situation. The waste paper markets were concerned with collections and reported to be giving consideration to a drive for more waste paper despite the uncertain effect of similar drive some months ago. Sulphites were brisk in all grades while kraft papers were likewise continued strong. Book papers were in heavy demand according to local reports, while covers showed no indications of letting up. Groundwoods reported strong buyer interest in all grades while the newsprint market, faced with further curtailment, was strong.

Swigart Holds Important Civic Office

John D. Swigart, Swigart Paper Company executive and always prominent in worthwhile civic activities in Chicago, has been elected treasurer of the Chicago Crime Commission for the coming year. This organization has made a demand for sincere political leadership in Chicago that will fight crime and rise above petty partisan politics. The Commission feels that the after-the-war period may cause an increase in crime in this area and is working to develop a sound basis for crime prevention and control.

Waste Men Unite on Wage Requests

In an effort to organize a united front of members of the salvage industry who will represent the industry in dealing with labor shortage problems, a new committee is being formed by the local waste industry which will represent more than 150 houses in the Chicago area, including wholesalers and retailers in waste paper and other waste and salvage fields. It will serve as a united front in backing petitions for wage adjustments with the War Labor Board and in dealings with the War Production Board and WMC. Hitherto, members of the industry are reported to have petitioned for wage raises individually without much success. The new committee is no permanent organization and has been formed solely for the purpose of working out programs to solve the labor shortage. Waste paper dealers here believe that if WLB can be persuaded to authorize a wage increase, the industry will be able to hire much needed additional labor. The situation is critical in that in one year the industry has lost more than one-third of its man power to the armed forces or to higher paying war industry.

Paper Man Heads Tax Reform Drive

Corwine E. Roach, president of the Capitol City Paper Company, and well known in fine and coarse paper association work, is now engaged in a most serious effort to aid in bringing about taxation reform in the State of Illinois. Mr. Roach is chairman of the Legislative Committee of the Illinois Chamber of Commerce which has presented a "5 point program" for tax modernization in the State. The program is to be translated into actual proposed statutes for submission to the 63rd General Assembly now in session and covers budgetary reforms, means of curtailing the delinquent tax problem and means of eliminating or consolidating various costly government agencies. Mr. Roach is also a director of the State Chamber.

Revise West Coast Pulp Prices

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 23, 1943—In order to enable West Coast paper mills to obtain wood pulp not available in the West and allocated to them from the East by the War Production Board, the Office of Price Administration today announced that the Eastern supplier of such shipments may charge the same maximum prices allowed on Eastern deliveries instead of the lower prices hitherto set for all deliveries west of the Continental Divide, and to Denver, Colorado.

Amendment No. 6 to Maximum Price Regulation No. 114 (Wood pulp) which is effective February 27, 1943, authorizes these prices only on Eastern pulp allocated by the War Production Board to the Western consumer mills. Wood pulp produced in the Western area and delivered there, whether or not allocated by the War Production Board, continues at prices $6 per short air dry ton less than the maximum prices listed for deliveries to consumer mills located East of the Continental Divide exclusive of Denver.

Amendment No. 6 also adds bleached soda wood pulp to the list of f. o. b. maximum prices established for Lend-lease sales. Lend-lease prices are on an f. o. b. basis while prices for domestic sales are on a delivered basis, which include certain basic maximum transportation allowances. Bleached soda wood pulp has not been sold hitherto for Lend-lease but such sales are now anticipated.

The f. o. b. maximum prices for Lend-lease of $60 per air dry ton for soda pulp produced in the Northeast and Lake Central producing areas, and $58 for soda pulp produced in the Southern producing area are computed by subtracting from the delivered domestic prices an amount equal to the weighted average of the transportation cost. This method was used for determining Lend-lease maximum prices for other grades of wood pulp.

R. L. Goes with S. B. Behrens & Co.

S. B. Behrens & Co., paper dealers, 54-58 E. 9th street, New York, announce that Robert L. Nelson, widely known and long connected with the paper industry, has become associated with that company effective February 15, 1943.

Superintendents Meet at Kalamazoo

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., February 19, 1943 — The American Pulp and Paper Mill Superintendents Association, Michigan Division, held its February meeting at the Park American Hotel, Thursday evening, February 18, with forty present. Al Perlick, chairman, opened the meeting by introducing a new member of the division, E. R. Vanatta, superintendent of the Western Board and Paper Company, and also announcing that the scheduled speaker, L. W. Cragie, National Field Secretary, was unable to come and in his place Bert Crooks, master mechanic of the Kalamazoo Vegetable Parchment Company, would address them.

Bert Crooks Speaks

Mr. Crooks' talk was primarily on maintenance and salvage as practiced in their plant. He put stress on the standardization of equipment wherever possible and related the advantage in maintenance by interchangeability of parts. This applied to pumps, valves, belts, chain falls, bearings, wire rolls, table rolls, etc. He described their various shops including the machine, electric, sheet metal, carpenter, pattern, and the completely equipped foundry, which the company maintains.

A careful salvage program is in constant operation and they salvage all stereotype and electrotype plates, lead and bronze castings, bushings, babbitt, copper most of which is reclaimed. They wind all their motors and clean and reseat all valves, maintain a hydraulic press and jack. All nuts and bolts are cleaned and rethreaded and all short lengths of pipe are welded into 16-foot lengths. An outline of the personnel of his department was in favor of understudies for all key jobs. He observed, however, that under present conditions this was almost impossible. A spirited and interesting forum was conducted at the close of Mr. Crooks' talk.

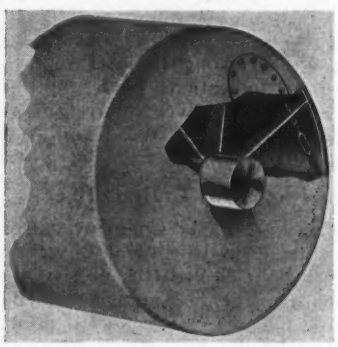
Those Present

Among those in attendance were the following:—

Ralph Atkins, Lee Paper Company; W. H. Astle, Michigan Paper Company; L. H. Breyfogle, Draper Brothers Company; Ray L. Barton, Michigan Paper Company; Bert Crooks, Kalamazoo Vegetable Parchment Company; F. L. Chappell, Hercules Powder Company; W. F. Costello, Longhead Company; A. W. Cole, Rex Paper Company; Wayne Crotty, Bryant Paper Company; Norman J. Cowie, Hawthorne Paper Company; J. A. Dean, Michigan Paper Company; A. G. Dreis, Hercules Powder Company; M. S. Fogerty, Michigan Paper Company; C. E. Gardner, Lee Paper Company; Carl Hoelderle, Anheuser-Busch; Fred Hodgemire, Hawthorne Paper Company; A. L. Klosterman, Hercules Powder Company; Joseph Klein, Michigan Paper Company; W. F. Luking, Waterbury Felt Company; R. C. Lyons, Longhead Company; Jos. E. Longhead, Longhead Company; L. H. LaLiberte, Kalamazoo Vegetable Parchment Company; L. E. Leas, Lee Paper Company; Lloyd Lynd, Michigan Paper Company; R. T. Mashburer, Hercules Powder Company; D. P. Moore, Sutherland Paper Company; Henry Neudorf, Rex Paper Company; Al Perlak, Kalamazoo Vegetable Parchment Company; Geo. H. Rice, Kalamazoo Vegetable Parchment Company; R. B. Stewart, Kalamazoo Vegetable Parchment Company; Glenn Sutton, Sutherland Paper Company; Paul Schrieber, General Dye Stuff Corporation; R. M. Sorlie, Longhead Company; Fred Ten Burch, Kalamazoo Vegetable Parchment Company; George Vannie, Beloit Iron Works; P. Van Norden, Sutherland Paper Company; E. R. Vanatta, Western Board Company; A. E. Woollam, Woollam Company; Joe Waber, Rex Paper Company, and Arnold Weller, Sutherland Paper Company.

New Circular Screen Support

A new circular screen support is announced by D. J. Murray Manufacturing Company, Wausau, Wis., upon the issuance of a patent to John B. Nowak and assigned to the company. To provide a simple and effective means for maintaining wound backing wires taut to assure a smooth surface on the filter cloth at all times, and to provide compact and efficient means of convenient adjustment of the tension of the filter cloth supporting the wire and to vary the tension of the filter screen backing wire which can be applied to new or old cylinders at moderate cost and without decreasing the filtering area, are some of the features of the new support.



Illustrated herewith is a cross-section of the new screen support which also provides an improved filter cloth mounting support that is durable and can be quickly and easily adjusted to maintain the cloth in proper operating condition.

Appoint Waste Material Committee

WASHINGTON, D. C., February 24, 1943 — WPB has announced a new Waste Material Suppliers Industry Advisory Committee with David Graham as Government Presiding Officer. The members of the committee include the following: Joseph A. Benedetto, D. Benedetto, Inc., New York, N. Y.; H. P. Christian, Pacific Coast Waste Paper Corporation, Los Angeles, Cal.; David M. Dickson, Penn. Paper Stock Company, Philadelphia, Pa.; Robert Johnston, Jr., General Paper Stock Company, St. Louis, Mo.; John S. Letellier, Letellier-Philips Company, New Orleans, La.; F. E. Wilcox, Industrial Paper Stock Company, Kansas City, Mo.; Harry Resnick, Acme Paper Stock Company, Louisville, Ky.; Harold Shilling, U. S. Paper Supply Company, Chicago; Haskell Stovroff, Buffalo Waste Paper Company, Buffalo, N. Y.; Stuart B. Sutphin, the I. V. Sutphin Company, Cincinnati, Ohio; and Paul J. White, Great Eastern Packing and Paper Stock Corporation, Maspeth, N. Y.

The Job of Price Administrator*

By Prentiss M. Brown[1]

Thank you, Harry, for that very splendid introduction. I shall always consider it a matter of great pride to recall the words that you said upon this occasion. The last time I spoke in this hall was in 1924 at the preconvention banquet before the famous McAdoo-Smith scrap in Madison Square Garden. As I look over those on my left and those on my right and those in front of me, I do not see any faces who were here that night.

I was picked by the Chairman of the Democratic National Committee — the new one — to make the speech at the Jackson Day Dinner on Washington's Birthday next week in Washington. Knowing that I had this obligation, I decided to try to find a substitute and avoid that speech if I could. So I went up the Hudson River a way to a gentleman who lives in the Valley near Poughkeepsie, and who is temporarily more or less a resident of Washington at the present time, and he has decided to substitute for me. So I do not have that obligation, and I think he will take care of the situation pretty well down in Washington.

I am glad this is Michigan Day, because I live in Michigan, have lived there all my life, and I am glad to be talking to people who are familiar with the timber, lumber and pulp wood business. I was born within earshot of the forests where the hack of the ax was heard and the whine of the saw as it drove through the maple log. I recall that my first athletic sport as a youngster was running the logs on the bosom of Lake Huron. I had a great deal of success in doing it as a youth, but I tried it again last summer, and I found that the logs were smaller and the man was bigger, with disastrous results.

As a lawyer, I think I know more about lumber law and lumber litigation than I do of any other subject. The name of Fletcher is a great name in Michigan. I heard the name Gilchrist. That likewise is a great name in Michigan. A little community in my small county of Mackinaw was named after the first Gilchrist who lumbered in northern Michigan, closely connected with the great lumbering operations that were carried on in the Straits regions. I have followed it with interest, and I have been intimately connected with it, and I am most happy, therefore, to meet you here today.

A Unique Personal Situation

In this job of Price Administrator for the nation, I have what I think is a most unique personal situation. So far as I can recollect, I am perhaps the first man who handled legislation creating an office, fought the battle for the law of October 2, 1942, which gave vitality and power to that office, and then by a queer quirk of fate and the verdict of the people of Michigan, was taken out of the Senate and given the responsibility of administering the laws that I wrote. So if it fails, I think to a greater extent than any other time the responsibility is mine.

I have a sense of difficulty—I think that is the best word—in meeting this situation. The consumers in the United States have never been organized. We have large organizations who do present the consumer viewpoint like the labor unions, but they are primarily producers. We have organizations of the women, such as the League of Women Voters, a great independent organization which gave me great help in the passage of these two pieces of legislation. But they do not exert and apparently cannot exert the same pressure and power down in Washington as do the great producer organizations. So my job is principally one of resistance.

I sit day after day listening to the requests of people who want me to do something, many many times with justice on their side. I have to sit there and represent those people who never come near and so often those whose voices are silent when their interests are so vitally affected. Only yesterday, I had to turn down my good friends, the Senators from Texas, Arizona, Florida, and California, in what was a pretty strong demand for a substantial rise in the price of citrus fruits. I had to resist my good friends from North Carolina, South Carolina, Alabama, Florida, Delaware, and the great early potato producing sections of the country and say, "No," to their requests for higher prices.

Needs Public Support

I guess I had better not go into the question of print paper prices at the present time. It might be a little bit unfortunate. I may say that I spoke to the Association of Newspaper Editors only last Saturday, and I didn't say anything there. So I am playing square between both of you at the present time. When that issue comes before us we will decide it on the merits and under the law in accord with what I think to be the principles of fairness and equity in the interests of the people of the United States.

This price control job is one which needs public support. We have strong powers of resistance, but we need your support. We need the support of all Americans, because one is inclined, when he hears so continually the requests of those who produce, to be overborne by their arguments. I want to point out to you in the little while that I will take today the fundamental crux of this situation.

When we passed the first price control law there was in it no substantial control nor any machinery set up for the purpose of stabilizing wages. The result was that the general principle was laid down, but the farm producers of the country urged, and with considerable justice, that since wages were not strictly stabilized and controlled we ought to let farm prices go somewhat beyond the ideal figure which farmers and farm leaders and legislators, interested primarily in farm prices, had for many years considered to be a fair and equitable formula — the formula commonly known as parity.

Subsequently, with great reluctance, those of us in charge of the legislation consented to a higher parity than that which had long been established. It became apparent during the summer of 1942 that

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[1] Administrator, Office of Price Administration, Washington, D. C.
* Presented at the Annual Luncheon of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 18, 1943.

the system would not work, that we did not have sufficient control. Thereupon ensued the President's Labor Day Message, and the law of October 2, 1942, which definitely and certainly fixes the general level of prices and wages as of September 15, 1942, with certain necessary and equitable exceptions, as the standard of wages and prices throughout the country.

A Just and Equitable Act

Today, the principle of that law, which is a just and equitable act, is being assailed on both sides. Two movements are in Congress at the present time —the Pace amendment which would redefine parity upward, and the movement in the Senate which has not yet been framed into a bill, but which will be before the Senate before very long, by which there will be eliminated from the calculation of farm and food prices the payments which the Government has been making for 10 years to the farmers in the calculation of farm prices. Either one of them will do us great injury. The two of them together will just about wreck the control of food prices in the United States.

My good friend to my right, Mr. Mead, who sits on the War Labor Board, and who is a member with me of the Byrnes Stabilization Committee, knows that at the present time the foundation of the drive for higher wages, particularly in the bituminous coal fields—which is the big opening wedge—is based upon the probability of the passage of these two farm measures in the House and the Senate, which would ruin price control.

I say to you with some knowledge of the subject, experience with it for the past several years, and as the responsible sponsor in the Senate of both bills —the latter one of which I wrote myself with my own hands—with that background of knowledge, if we break through the price structure as it is today, the wage structure will inevitably be broken through, and we will face in this country the most dangerous domestic situation that this nation has ever faced. It would be equal to a tremendous defeat on the military front.

These measures must not pass. There must be, and I am fairly confident there will be, on the part of those in charge of the administration a determination that we cannot accede to the demands in the bituminous coal situation. The great City of Detroit, the greatest center of war production in the United States in southeastern Michigan, is totally and wholly dependent upon the continuing every-day production of bituminous coal. There must be no strike and there must be no compromise. We must meet this issue squarely and fairly. If we do, I am satisfied that the American people will back the Chief in that effort, and I am satisfied that in the end we will win out in the battle on the farm front. We cannot now stop to make adjustments which many might think are necessary to bring about economic justice in the United States.

Will Stand by Principle

We never have achieved it, but we have come much closer to it than in any nation of the world. The theory back of the October 2nd Act was that we were to take things as they are, with adjustments to cure gross inequities and stand by that principle. As far as the Office of Price Administration is concerned, we will stand by that principle. If they cut our appropriation and throw us out of Washington, nobody, Harry, in a personal sense, will be happier than I to go back to the blue waters of Lake Huron and the great forests of northern Michigan where I would like to be.

You know that I, in the eyes of the general public, was defeated, because I fought the battle of October 2nd and carried that bill through. I think I was never quite so thrilled as I was in the days immediately following when the president of a great corporation down in the State of Delaware published, at an expense to him of some $1200, a full page ad in the Washington Post, commenting upon the battle that was then made. I think, and I thought then, that it was far more important that the stabilization law should pass than that Prentiss Brown should stay in the United States Senate.

If one can throw aside the feeling that we all have —to use a trite, common, perhaps ungrammatical phrase—that we hate to lose, I would have been very glad to go back to northern Michigan and stay. I thought that was what the people of Michigan told me to do. I fully intended to stay there. Well, I had to go back to vote on a few measures. When I returned, I was summoned to go "downtown." I had been there many times before, and I had been the subject and object of the marvelous art of persuasion that the President has. I well recall my first trip down. Senator Harrison, who was the Chairman of the great Committee on Finance, where I did much of my work, knew that I was inclined against the reciprocity treaties. The vote in the Senate was going to be close. I had a good speech prepared against the proposition. I went down and saw the Chief at about 11 in the morning, and by 12:30 I was on the floor of the Senate, urging the adoption of the reciprocity agreements.

It was not always so. As my Michigan friends well know, there were many times when my powers of resistance were somewhat more firm on the Supreme Court issue, where many people gave me some credit for eventually defeating the bill and on many other measures, where it was a question of conscience.

Did Not Hesitate to Express Views

That leads me to what I think is the heart of what I have to say today to this audience. From 1933 through 1940, there were many times when I was in sharp disagreement with my party, with my Chief, and in those days of peace, I did not hesitate to express my views. I was the only Democrat on the House Banking and Currency Committee to vote against the so-called elimination of the gold clause in the United States governmental bonds. I was one of seven who voted against it, and though generally I was in agreement with the philosophy and the platform of my party, I exercised the right of an independent American to differ when it was necessary to do so. As the days came on and the storm clouds in Europe became darker, as we approached the days when Lend-Lease was under discussion, I caught hold of myself one day and said, "My country is in peril. The American people have chosen a leader. In 1940, they chose him under the most extraordinary circumstances in our history, the breaking of the third term tradition." I was minded against it. All my training as lawyer, my belief in tradition and precedent, was against it, but I thought that in that crisis we should retain experienced leadership, and we did. The American people decided that way. I

then said a thing which has been used not only throughout my state, but by representatives of the other party throughout the nation, and it was the statement which I repeat here, that in matters of foreign policy and in the conduct of the war I am going to follow the Chief, even when it is against my own better judgment.

I say to you now—and I say it in all seriousness, and I say it as one whose political future is behind him—that I have never known a time when there was so much disunity in the Congress of the United States, when there was so much back-biting and fighting between the American people over inconsequential things. Only a short time ago it extended much farther. It went to our Allies in this great war. How much was said by many, some in the Congress itself, about England and her ambitions and her desire to win material things out of this war, forgetting that from those terrible June days, when mighty France fell before the onslaughts of the German hordes, down to that June day when Germany attacked Russia, the citadel and fortress of England stood alone against the hosts of evil in this world.

One of Most Heroic Moments

Regardless of what may be called flyspecks on her past and regardless of the natural ambitions that nations and governments have to acquire additional territory, trade, and so on, in the future, I say to you that that was one of the most heroic moments in the long history of world civilization.

Today, that same spirit seems to exist with many. You see it in the Dies Committee of the House of Representatives against that powerful and potent force that is beating back the German hordes on the plains of Russia today. I hope all of us will realize that unity in spirit is necessary, that we will remember that the great foe is that military bund and junta which on three occasions in the lives of the men and women who are present today have broken the peace of the world, that it is necessary in the days of the future that these great nations who are not united together must stand together. And, my good friends, they won't, if this back-biting, this under-the-table talk, these criticisms of the war effort of our Allies and our friends, are continued, if these seeds of disunity which have been sown are permitted to nurture and grow and live and become powerful elements in our life.

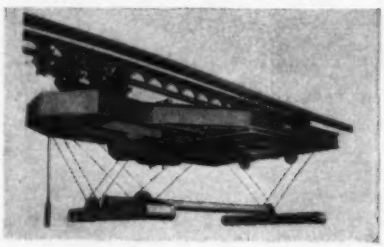
We are one of the great "have" nations of the world. We probably have less by way of territorial ambition than any other great nation in the world. But, my good friends, the Russians are much like us. There are 160 millions of them. They have the most extensive territory in the world. They have tremendous resources, and their objective, as stated definitely by those in charge of their government, is to retain what they have. I don't mean by that either our nation in its demand for air bases, or other nations who are with us in their desires for better protection, may not for some years to come, for some decades to come, require some territory. But they know, and we know, from the bitter experience following 1918, that selfishness, aggrandizement, national selfishness, will only result in a war in which your grandchildren and mine will again be engaged in deathly struggle.

Finally, I plead for that unity here in the country itself. On the domestic front, in the emergency agencies, one of which I head, we need the support of the American people as a whole. In the matter of the carrying on of the war, to be specific, in the matter of the determination of the size of our Army and the necessity for troops in the field, in the air, and on the ships, I want to leave it to the military authorities, and I think the Congress and the people should get behind them; I am afraid that at the present time they are not.

We need a rebirth of that spirit of unity. We all deplore the temporary losses in North Africa—which have depressed many of us in the last two or three days—where our forces for the first time are in active combat with the enemy. But out of it, my good friends, may come a realization that Joe Stalin and his friends can't win this war alone. Out of it may come a realization that there is a lot of venom and power in the snake yet. Let us not become too complacent. Let us not feel that we can again enjoy the American sport of fighting each other. Let us march on behind the Chief together to victory!

New Stabilized Tramrail Carrier

The Cleveland Tramrail Division of The Cleveland Crane and Engineering Company announce a new stabilized tramrail carrier, that solves one of the oldest problems in hoisting, that of suspending a load rigidly with the use of flexible hoisting ropes.



By a simple patented arrangement of the ropes to form a triangular suspension, a load can be held rigidly in place so as to eliminate longitudinal, lateral and rotational sway. The rope angles have a definite relation to one another and have been worked out according to a mathematical formula.

A load can be raised or lowered through a considerable distance and yet with nothing more than the hoisting ropes supporting it, will remain as rigid as if guided in an elevator shaft. Even if the load should be considerably unbalanced, the carrier will hold it rigidly in place. For instance, if the carrier were used to convey airplanes and several men were to sit on the extremity of one of the wings, the carrier would support the load solidly.

Another very desirable advantage of the carrier is the feature permitting the tilting of a load in either direction with relation to the rail on which the carrier is propelled. If it is desirable to rotate the load, this may be accomplished through use of a trunnion-type load bar. Thus in most cases it is possible to place any part of a load in any position that will be most convenient and accessible.

The stabilized carrier may be operated on two standard Cleveland Tramrails or on a double girder Tramrail crane bridge. It also may be operated on the regular type overhead Cleveland Tramrail rail on each side of which are provided parallel flat rails or I-beams for the support of stabilizing rollers attached to the carrier. This rail arrangement keeps the carrier level at all times, regardless of type of load or its position, and permits moving the carrier through switches to other tracks.

Lt. Don Nesbitt in South Pacific

Donald A. Nesbitt, vice-president of The Cincinnati Cordage and Paper Company, Dayton, Ohio, is now with the aircraft forces. He was appointed Lt. A-V (S), USNR a short time ago and received two months' officers' training at Quonset Point, Rhode Island. On completing this training he reported to the Commander of Aircraft, South Pacific Force.

Mr. Nesbitt was born in Dayton, Ohio in 1906, attended Steele high school, Culver Summer Naval

DONALD A. NESBITT

School and was graduated from Cornell University in 1928. He served for two years with the artillery R.O.T.C., and was graduated from the Harvard School of Business Administration in 1929. In the same year he became associated with The Cincinnati Cordage and Paper Company, became a director in 1932 and vice-president in 1939.

Mr. Nesbitt has long been active in civic affairs, holding memberships in the Rotary Club since 1939, in the Junior Association of Commerce since 1934 and its president in 1938, secretary of the State Junior Association of Commerce, and U. S. Junior Chamber in 1937-1939, chairman of the Youth Welfare Committee, 1935-1937. He was also Eagle Scout, 1919-1922, chairman of Navy Day Committee, 1934-1936, and was with the U. S. Navy Reserve as Ensign D-V (s), from 1934 to 1939.

Raybestos-Manhattan Sends 1000 Men

John Edward Mucha, 34 Van Winkle Avenue, Garfield, N. J., had the distinction of being the 1,000th employee of The Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., Passaic, N. J., to enter the armed forces.

Private Mucha was inducted February 3 by Local Board No. 8 of Garfield and left for Fort Dix on February 10. He was employed in the Wrapped Tubing Department at the Manhattan plant.

To date, 1,003 Manhattan men out of a total of 3,900 employees are serving in the armed forces. This is an average of one man in uniform for every three and nine-tenths persons employed and is believed to be a record for industrial plants in the busy Passaic area. Manhattan's service flag in the company cafeteria now bears the figures 1003, which also is believed to be a record total for Passaic.

Change Crepe Paper Prices

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 24, 1943 — Three changes in the maximum pricing provisions for unprinted single weight crepe paper in folds have been announced by OPA. They are:

1. The maximum price for manufacturers on the 7½′ x 20″ fold (1½-1 ratio) reverts to $3.85 per gross from the $3.96 level in effect since May 11, 1942.

2. The prevailing retail ceiling of 10 cents per fold on the 9′ x 20″ fold (2-1, 2¼-1, and 2½-1 ratios) is extended until May 15, 1943 instead of being reduced to 9 cents per fold February 15, 1943.

3. The retail ceiling of 5 cents per fold on the 7½′ x 20″ fold (1½-1 ratio) is continued in effect beyond May 15, 1943.

Amendment No. 15 to Maximum Price Regulation No. 129 provides these changes, effective February 18. This regulation covers a wide variety of converted paper products.

In the first change OPA is merely removing from the regulation a temporary ceiling price designed to encourage production of this size fold in lieu of the 10′ fold of the same ratio to assist in the War Production Board's voluntary conservation program. Since this program is no longer operative, the maximum price previously in effect is restored.

Extension of the expiration date from February 15, 1943 to May 15, 1943 of retail ceiling prices for the various ratios of the 9′ x 20″ fold is authorized to permit orderly and equitable liquidation of existing stocks of sizes no longer being manufactured. The February 15 scheduled price reduction would have resulted in inadequate returns to those still holding these stocks.

In the third change the maximum price of the 7½′ x 20″ fold (1½-1 ratio) which was to have become 4 cents per fold February 15, 1943 will continue at its present ceiling of 5 cents per fold. Further examination has revealed that the majority of sellers had the 5 cent price established during March 1942, the base period for distributors and retailers, and that a price of 4 cents per fold would not permit adequate return to them.

Ventilation in the War Effort

Although the need for ventilation in all types of buildings is recognized more widely than ever before, it became necessary for the WPB to forbid the general use of metals in roof ventilators. In restricting the use of metals, however, the Critical Materials Division recognized the necessity of proper industrial ventilation for the greatest war effort and accordingly permitted the manufacture of metal ventilators for "essential applications." These include applications where metal ventilators are necessary because of intense heat, corrosive fumes, etc. Other "scarce" materials are permitted for manufacture of ventilators intended for use in essential applications where critical metals are not vitally necessary.

The Swartwout Company, Cleveland, has added a line of roof ventilators made of non-critical materials and has named it the "NCM" line. Metal used in these ventilators — for bracing and assembling — amounts to less than 5%. Several of the new designs parallel closely the original styles made of steel, and are found to be equally effective in performance.

Small Worm Gears

A great variety of motor-driven industrial equipment, such as mixers, driers, automatic furnaces and ovens, churns, small conveyors and elevators, mechanical stokers, door openers, etc., requires only small power, but, as small electric motors run at high-speeds, speed reducers are necessary. The small worm gears here shown are produced by the De Laval Steam Turbine Company, Trenton, N. J., for ratios of 3⅝ to 1 up to 60 to 1 and in 3 inches and 3½ inches center distances. They are distinguished by having casings cast in one piece, the casing with side plates totally enclosing the working parts and serving as an oil reservoir from which the bearings and gear teeth are lubricated. The interior is accessible upon removing one of the side plates, although the only attention required is checking the oil level at long intervals, for which purpose a gage cock is provided. The worm shaft is carried on ball bearings and the wheel shaft on Timken bearings. The worm and worm shaft are of carburized nickel steel, heat treated after machining, while the worm wheel is of chill-cast bronze with hobbed teeth. The units are supplied for either top or bottom drive, with shaft extension to either right or left, or in both directions. The lower ratios can be used as speed increasing gears up to a maximum speed of 2000 revolutions per minute.

New Literature

Wartime Maintenance Digest, issued by Oakite Products, Inc., 57 Thames street, New York, describes how new, time-saving degreasing materials, de-scaling methods and related cleaning techniques are effectively helping pulp and paper mills successfully solve the problems of shortening equipment down-time, conserving man-power and stepping up efficiency in handling 41 vitally important, commonly recurring equipment maintenance jobs. On each job discussed, this wartime maintenance guide outlines in data sheet form for quick, convenient reference (1) the material used, (2) methods followed, (3) time saved, (4) fire or other hazards eliminated, and (5) other advantages gained essential to increasing operating efficiency as well as securing greater output and longer service from mill equipment and machinery.

Electric control, is the subject of Catalogue N-00A, issued by the Leeds & Northrup Co., 4934 Stanton avenue, Philadelphia, Pa. It describes the company's automatic "Micromax" control equipment, capable of handling any process which can be controlled by a valve or other regulating device. A detailed explanation is given on how the equipment is adjusted to fit the needs of a particular process.

Thermometer data is presented in five publications issued by the Wheelco Instruments Co., Harrison and Peoria streets, Chicago, Ill. Bulletin Np. G23-2, gives specific information on bulbs, methods of mounting, sockets, capillary and its armor, charts, scales, etc. Bulletin No. G603-2, covers the company's "Therm-otrol," industrial indicating thermometer, with ranges between —70 and +1000°F. Bulletin No. G303-3, describes the Wheelco Model 4600, indicating thermometer, and Bulletin G403-2 covers the Wheelco recording thermometers, one and two pen models, for use with the electronic principle of control. Wheelco Bulletin G503-2 describes the electronic principle of control of temperature. Specifications and a detailed explanation of operation are included.

Second Cut in Newsprint is Deferred

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 24, 1943—The second scheduled curtailment of newsprint, proposing a cut of not to exceed 10% which would have been effective April 1, is to be held in abeyance for the time being.

This was announced to members of the newspaper industry advisory committee meeting today in Washington by W. G. Chandler, Director of the Printing and Publishing Division, and Donald J. Sterling, Consultant to the Chairman of the War Production Board. It was emphasized, however, that today's statement will have no effect upon the provisions of the present order governing the use of newsprint.

Today's statement followed the arrival in Washington of R. L. Weldon, Newsprint Administrator of Canada, whence comes three-fourths of the newsprint supply of the United States, who stated that a greater volume of wood has been cut in eastern Canada than was expected, easing the situation for the time being.

However, Mr. Weldon joined Mr. Chandler and Mr. Sterling in counseling continued economy in the consumption of newsprint by the publishers with a weather eye to the future. "In this manner the market will not overtake supply," they said. "In this manner a seller's market may be avoided; in this manner through exercise of mutuality of interest between manufacturer and consumer, more drastic orders may be avoided tomorrow."

WPB officials pointed out that the existing order governing the curtailed use of newsprint remains in full force and effect, and these officials joined with the committee in urging continued efforts by publishers throughout the country for all possible saving in paper in the interest of the war effort.

Bristol Co. Announce Appointments

Howard H. Bristol, president of The Bristol Company, Waterbury, Conn., announces the appointment of L. G. Bean as vice-president in charge of engineering and sales, from the position of vice-president and general sales manager, which he has held since 1939. Mr. Bean will have his headquarters in Waterbury.

Harry E. Bean, field sales manager, has been named sales manager, with headquarters at Waterbury.

E. L. Stillson, who has been associated with the company's field engineering department since 1940, has been appointed assistant sales manager, with headquarters at Waterbury, Conn.

Revise Definitions of Maintenance

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 24, 1943—Amendment of Priorities Regulation No. 11, revising its definitions of maintenance, repair and operating supplies, brings all War Production Board definitions of these materials into conformity with those contained in Controlled Materials Plan Regulation No. 5. Priorities Regulation No. 11 governs all operations of Production Requirements Plan units. Today's changes were preceded earlier in the week by similar modifications of Priorities Regulation No. 3.

Specifically excluded from the definition of maintenance, repair and operating supplies in Priorities Regulation No. 11, as amended today, are the following:

1. Fabricated containers (in knock-down or set-up forms, whether assembled or unassembled) required for packaging products to be shipped or delivered.
2. Printed matter and stationery and office supplies.
3. Paper, paperboard and products manufactured therefrom; molded pulp products.
4. Fuel or electric power.
5. Office machinery or office equipment (whether purchased or leased).
6. Clothing, shoes or other wearing apparel (with specific exceptions), if made of leather or textiles.
7. Production material.
8. Materials for plant expansion or plant construction.

Today's amendment, however, does not prevent acceptance during the second quarter of this year by a PRP unit of supplies as previously defined, following proper application of preference ratings to purchase orders placed before today's date.

J. R. Kimberly Gets Leave from WPB

WASHINGTON, D. C., February 24, 1943—Curtis E. Calder, Director General for Operations, has announced that John R. Kimberly, assistant director general, has been granted a leave of absence during which he will return temporarily to work for his own corporation. He is director of manufacturing of the Kimberly-Clark Corporation, Neenah, Wisconsin.

Mr. Kimberly has resigned as Assistant Director General for Operation, but has agreed to return to a position with the War Production Board within two or three months.

Coming to Washington in the summer of 1941 as a member of a pulp industry advisory committee, Mr. Kimberly was appointed consultant in the Industrial and Office Machinery Branch in the Office of Production Management. He became Assistant Chief in the Bureau of Industry Branches when the War Production Board was formed in January, 1942, Chief of the Bureau in June, and later Assistant Deputy Director General for Operations and Deputy Director General for Industry Divisions. He was appointed Assistant Director General on January 12, 1943.

Paperboard Garbage Cans

A paperboard garbage can, developed by Container Corporation of America, and manufactured by the Arvey Corporation, Chicago, is the outgrowth of a search for containers to replace those made from critical materials.

Container Corporation of America has long studied the problem of supplying heavy-duty paperboard drums so necessary for carrying materials, such as asphalt, greases, waxes, etc., for which metal is no longer available. A very practical paperboard garbage container just grew out of these studies. It was found, however, that for best results the container must be completely finished by the manufacturer and shipped in a ready-to-use form. This required special equipment and production lines in Container's fabricating plants, which would probably be justified by the potential volume but difficult of attainment under war conditions.

Therefore, to meet a pressing demand, a search was made for existing manufacturing facilities elsewhere. The Arvey Corporation was finally selected and licensed by Container Corporation of America. Arvey was found to be particularly well equipped for the job with plant capacity, and an organization all ready to produce, using a special asphalt-treated paperboard supplied by the Consolidated Paper Company of Monroe, Mich. The containers are now on the market, sold under the name "Utility Cans" through the regular channels of distribution.

Eli deVries Heads Paper Exporters

Signalizing completion of its first year, the United States Paper Exporters Council, Inc., held its annual meeting February 18 at the Waldorf-Astoria.

The council elected as its officers for the coming year: President, Eli deVries, president of Parsons & Whittemore, Inc.; vice-president, George G. Cobean, president of Bulkley Dunton Paper Company (S. A.); secretary-treasurer, Frank W. Smith, vice-president of National Paper and Type Company.

In addition to these three officers the new board of directors will also include: Harry Bengtsson, executive vice-president of the Paper Company Van Reekum of New York, Inc.; Adalbert Greiner, president of China American Paper and Pulp Company; Fred C. Strype, president of Fred C. Strype, Inc.

The council's legal advisers are Javits & Javits, attorneys of New York City and Washington, D. C.

Elwin Walker of Walker Goulard Plehn Company, Inc., retiring president of the council, reviewed the council's activities for the past year, emphasizing its spirit of cooperation with our government agencies and the resultant clarification of paper exporters' problems under necessary government control.

Mr. deVries in assuming the presidency expressed his hope for continued cooperation with the government as a necessary means of emphasizing the paper exporters' role in the furtherance of the war effort and in the supply of an essential civilian commodity to our friendly allies.

Linseed Straw for Paper Fiber

Linseed straw for paper making has been the subject of a series of investigations conducted by the Harcourt Butler Institute, Cawnpore, India, according to a report to the Commerce Department.

The fibre extracted after the seed is threshed is found to be strong and can be used in the manufacture of finer grades of paper. Investigations are now in progress to determine the best methods of bleaching and softening the material and on completion of the research it is planned to utilize the fibre in paper production.

Obituary

C. K. Boyer Dead

C. K. Boyer, 56, manager of the Interlake Pulp and Paper Company division of the Consolidated Water Power and Paper Company at Appleton, Wis., died Thursday, February 11, at Rochester, Minn. He had been at the Mayo Clinic seeking relief from an illness which forced him to give up his duties December 4.

Mr. Boyer was a native of Pennsylvania, where he was born April 16, 1886. He was a graduate of Bucknell University, Lewisburg, Pa., and took postgraduate work at Chicago Theological Seminary, intending to enter the ministry. He left for service in the World War in 1917-18, however, and was stationed at Hoboken, N. J., holding the rank of captain in the army.

Returning from war service, Mr. Boyer joined the Consolidated organization in 1919. He was engaged in personnel work at the main office at Wisconsin Rapids, Wis., for two years and then took up manufacturing operations. He was a trained chemist, and was in charge of several departments as foreman. He was appointed manager of the Appleton mill in 1924.

Always active in civic affairs, he served as president of the Appleton Chamber of Commerce, and from 1933 to 1939 was a member of the school board at Appleton, during the period when a new million dollar high school was constructed. He was senior deacon of the First Congregational church, and a member of The American Legion, the Masonic lodge and the Butte des Morts Golf Club. Survivors are the widow and three daughters, Ivis and Marguerite, at home, and Mrs. Douglas Mitchell, Cleveland, Ohio.

Funeral services were held Saturday afternoon, February 13, at the First Congregational church at Appleton, conducted by the Rev. Dascomb Forbush, pastor, and Dr. John W. Wilson, parish assistant. Officers of the Consolidated company and mill workers attended in a body. Burial was made in Riverside cemetery at Appleton, where military rites were conducted by the American Legion.

Charles A. Harmon

POTSDAM, N. Y., February 23, 1943—Charles A. Harmon, 86 years old, for many years prominent in the paper industry of Northern New York, died last week at his home after being ill for a few days. He was a brother of Herbert Harmon, who died in 1936 at the age of 82. The latter was for many years secretary of Knowlton Brothers, Inc., prior to his death. Charles A. Harmon, who died this week, was senior member of the firm of C. A. Harmon & Son, machinists, Watertown. In 1913 while employed as chief engineer at the Racquette River Paper Company he met with an accident which resulted in the loss of an arm. The principal survivors are his wife, a son and a niece.

Mason Hulett

Mason Hulett, of Farrel-Birmingham Company, Inc., of Ansonia, Conn., and Buffalo, N. Y., died suddenly February 7, in Washington, D. C.

Mr. Hulett was widely known throughout the gear industry, having been connected with the New York office of Farrel-Birmingham Company for the past nine years as sales engineer and consultant on gears.

At the time of his death Mr. Hulett was on leave of absence from Farrel-Birmingham Company and was serving as Chief of the Industrial Gear and Speed Reducer Unit, Material Handling Equipment Branch, War Production Board, in Washington.

Mr. Hulett was a graduate of Rensselaer Polytechnic Institute, class of 1914, with a degree of Civil Engineer. He was born in Granville, New York, in 1891. He is survived by a son, Mason Tenney Hulett, a student at Loomis School in Windsor, Conn., and by two brothers, both of Granville.

Mrs. Amelia F. Heid

Mrs. Amelia F. Heid, 84 years old, wife of Lewis Heid, vice-president and treasurer of the F. F. Heid Company, general paper merchants, Wilmington, Del., died early this month in Delaware Hospital. She had been ill about two months.

The funeral was held from the Doherty Funeral Home. Solemn requiem mass was said in Sacred Heart Church. Interment was in Cathedral Cemetery.

In addition to her husband, Mrs. Heid is survived by a son, Ferdinand F. Heid, president of the F. F. Heid Company.

Carl Jentz

Carl Jentz, 73, of 44 Newfound street, Canton, N. C., prominent in the paper manufacturing industry, died in an Asheville hospital February 14 after a four-day illness.

A native of Germany, Mr. Jentz came to the United States in 1890 and was identified with the paper manufacturing industry. He first moved to Canton in 1907 when the Champion Paper and Fibre Company started operations there. He left Canton three years later but returned in 1929 and was connected with the Champion company there since that time.

Mr. Jentz was a member of the Pulp and Paper Mills Superintendents Association and last November was made a lifetime member of the organization when it met in Atlanta. He was the first member in the Southeastern district ever to receive this honor, and at the time it was given was the oldest member of the group.

Surviving are a son, Carl D. Jentz, department superintendent of the St. Lawrence Paper Mill Company at Three Rivers, Quebec, and a daughter, Miss Thea Jentz, member of the main office staff of the Champion Paper and Fibre Company.

J. M. Davies to be Research Director

John M. Davies, in the research division of The B. F. Goodrich Company since 1926, has been named director of physical research, it is announced by Dr. H. E. Fritz, company research director.

A resident of Summit county all his life, Davies is a graduate of Central high school and the University of Akron where he received his science degrees. He also did graduate work at the University of Chicago.

He was an instructor in physics at University of Akron before joining B. F. Goodrich as a physicist becoming a group head in the physical research department in 1939.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending February 20, 1943

STOCKS

	High	Low	Last
A. P. W.	2¾	2½	2⅝
Armstrong Cork Co.	34¼	32¾	33¼
Celotex Corp.	11	10½	10⅝
Celotex Corp., pf.	87	86½	87
Certain-Teed Products Corp.	4⅛	3⅞	4
Certain-Teed Products Corp., pf.	40¼	38¼	39
Champion Paper & Fibre Co.	19½	18½	18½
Champion Paper & Fibre Co., pf.	105	101	105
Congoleum Nairn Co.	19¾	18⅝	18⅞
Container Corp. of America	21½	19⅛	21
Continental-Diamond Fibre Co.	9	8⅝	9
Crown-Zellerbach Co.	13⅞	12⅝	13⅛
Crown-Zellerbach Co., pf.	90½	90½	90½
Dixie-Vortex Co.	12½	12	12
Dixie-Vortex Co.—A	39¾	38½	39¼
Flintkote Co.	18⅛	17¼	18⅛
Robert Gair	3⅞	3¼	3⅜
Robert Gair, pf.	13⅛	12	12¼
International Paper Co.	10¾	9⅞	10⅜
International Paper Co., pf.	57	55¼	55¾
Johns-Manville Corp.	79½	75½	76
Johns-Manville Corp., pf.	130	129	130
Kimberly-Clark Corp.	30	29⅛	29⅛
MacAndrews & Forbes	24½	24	24½
MacAndrews & Forbes, pf.	....	....	....
Masonite Corp.	35½	34¾	35¼
Mead Corp.	8¾	8¼	8½
Mead Corp., pf. A—6%	81	80	81
Mead Corp., pf. B—5½%	73½	72	73
Paraffine Companies, Inc.	40	39	39
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	13½	13⅛	13¼
Rayonier, Inc., pf.	29¾	29	29¾
Ruberoid Co.	23½	22¼	22½
Scott Paper Co.	42⅝	41¾	41¾
Scott Paper Co., pf.	115	114	115
Sutherland Paper Co.	27⅝	26⅞	26⅞
Union Bag & Paper Corp.	10½	9⅝	10⅛
United Paperboard Co.	4¼	4⅛	4⅛
U. S. Gypsum Co.	64½	62¼	62½
U. S. Gypsum Co., pf.	175½	175	175½
West Virginia Pulp & Paper Co.	14⅜	14	14⅛

BONDS

Abitibi Pulp & Paper Co. 5s '53	....	....	....
Celotex Corp. 4½s '47	101¼	101	101
Certain-Teed Products Corp. 5½s '48	96½	96	96⅛
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	106⅛	106⅛	106⅛
International Paper Co 5s '47	104½	104	104
Mead Corp. 3¾s '55	....	....	....
West Virginia Pulp & Paper Co. 3s '54	103¾	103½	103¾

New York Curb Exchange

High, Low and Last for Week Ending February 20, 1943

STOCKS

	High	Low	Last
American Box Board Co.	5½	5½	5½
Brown Co., pf.	....	....	....
Great Northern Paper Co.	33½	31	31
Hummel-Ross Fibre Corp.	4	3¾	3⅞
National Container Corp.	10¼	10	10
St. Regis Paper Co.	3⅛	2¾	2¾
St. Regis Paper Co., pf.	121½	121½	121½
Taggart Corp.	4	3¾	3¾

BONDS

American Writing Paper Co. 6s '61	91	90	90

Container Corp. Reports $2,401,748

The annual report to stockholders covering 1942 operations of Container Corporation of America and subsidiary companies has been released for printing and will be mailed to stockholders in the near future. Walter P. Paepcke, President, reports:

"The consolidated net profit for 1942 was $2,401,748 compared with $2,327,177 for 1941. In each case earnings are net after administrative charges, interest, and provisions for depreciation, bad and doubtful accounts, local and Federal taxes, including excess profits taxes.

"These earnings are equivalent to $3.07 a share on each of the 781,253 outstanding shares of capital stock. Quarterly earnings per share were:

1st Quarter	$ .90
2nd Quarter	.67
3rd Quarter	.65
4th Quarter	.85 *
	$3.07

* After adding year end adjustments representing 16c per share.

"Provisions for Federal income and excess profits taxes, included in the above figures, were $6,180,000 for the year 1942 (net after deduction of $601,000 post war credit) as compared to $4,415,000 for the year 1941.

"Consolidated net sales for 1942 were $49,533,239 or an increase of 6% over the net sales of $46,714,221 in the preceding year.

"It is estimated that between 40% and 50% of the production of our corporation is now being used in connection with the war effort.

"The entire amount of $2,900,000 bank term credit outstanding at the beginning of the year was prepaid and this is the first time that the corporation has been completely without long term obligations since its inception sixteen years ago. During the year, $7,108,394 of U. S. Government securities were purchased including $7,007,428 of tax series notes. The latter are usable in payment of Federal income and excess profits taxes and are in excess of the required accrual of this tax liability. Additions to plants and equipment amounted to $634,063. Dividends of $1,171,879 were paid during the year, representing $1.50 per share on outstanding capital stock. The reduction of working capital of $1,020,444 is more than accounted for by the prepayment of the entire unpaid balance of $2,900,000 of the bank term credit."

Barber-Ellis Nets $1.38

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., February 23, 1943—Barber-Ellis of Canada, Ltd., in the year ended December 31, 1942, had a net profit of $64,702, equal after regular preferred dividend requirements to $1.38 a share on 44,000 common shares of $10 par value outstanding. This compares with net profits of $49,294 or $1.02 a common share in the previous year.

The balance sheet as at December 31, 1942, shows current assets of $996,528 and current liabilities of $285,109, leaving net working capital of $711,419 compared with $696,449 at the end of the previous year.

St. Lawrence Paper Mills

The report of St. Lawrence Paper Mills, a constituent company of the St. Lawrence Corporation, showed net profit of $514,998 for the year ended December 31, 1942, equal to $3.74 per share on the average number of preferred shares outstanding. In the previous year, net profit was $545,629 or $3.98 per share.

Operating profits were $1,494,855 against $1,539,404, and the company received $108,000 in dividends on Lake St. John preferred, same as in 1941. Provision for depreciation was $734,151 against $732,-

493, depletion $53,705 against $44,282, and Dominion taxes $300,000 against $325,000.

Balance sheet shows current assets of $4,436,203 against $3,829,162 last year, current liabilities $704,-117 against $800,730, indicating net working capital of $3,732,086 against $3,028,432.

St. Lawrence Corp.

The annual report of St. Lawrence Corporation, Limited, for 1942 states that during the year 1,450 Class "A" preferred shares were purchased and cancelled. This brought balance outstanding to 288,177 shares.

On these shares, the corporation was able to pay dividends of $432,591 or $1.50 per share, as a result of dividends of $447,348 or $1.50 per share received on holdings of Brompton Pulp & Paper Company stock. After expenses and bank interest of $15,786 there remained earned surplus of $25,270 at December 31, 1942.

During the year the corporation increased its holdings of St. Lawrence Paper Mills common stock by 29 shares to 510,130 shares, and those of Brompton Pulp & Paper by 150 shares to 298,257 shares, while those of Lake St. John Power & Paper common remained unchanged at 24,811½ shares.

Baldwin Co. To Handle Brown Line

To meet increasing demands for L. L. Brown papers in the New York metropolitan area, the Baldwin Paper Company, New York City, has been appointed a distributor of Advance Linen Ledger, Advance Bond, L. L. Brown's Fine and Greylock Ledger, all products of the L. L. Brown Paper Company, Adams, Mass. The first two papers are made from 100% new, white cotton cuttings. L. L. Brown's Fine is formed from 85% new cuttings and Greylock Ledger from 75% of this selected raw material.

Great Northern Votes Dividend

The Great Northern Paper Company has declared a dividend of 40 cents, payable March 3 to stockholders of record February 20. Payments in 1942 were 50 cents on March 3, June 1, September 1, and December 1.

Kalamazoo Earns $1.31

The Kalamazoo Vegetable Parchment Company, for 1942, reports a net income of $656,096, equal to $1.31 each on 500,000 capital shares, against $833,-995 or $1.67 a share the year before; net sales, $13,-959,769, against $13,821,423.

Hummel-Ross Loses

The Hummel-Ross Fibre Corporation for 1942, reports a net profit of $405,696, equal to 93 cents a share on the common stock, compared with $604,145, or $1.44 a share, in 1941.

Keyes Fibre Profits Up

The Keyes Fibre Company, for 1942 reports net income after $398,960 Federal income taxes, was $210,945, against $317,753 in 1941 after $185,108 taxes.

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CONSTRUCTION NEWS

Under limitations order L-41 all projects involving expenditures of more than $5,000 must be specifically approved by the War Productions Board. The status of projects reported herewith under the provisions of the order is not known.—EDITOR.

Jersey City, N. J.—The Protex Products Company, 61 Bishop street, manufacturer of paper and cellophane specialties, has concluded arrangements for purchase of a three- and five-story industrial building on local site at 44-50 Sherman avenue, formerly used by American Cake Company, and will take over at once. Structure will be improved and equipped for expansion in converting plant. It is proposed to remove present factory to new location as soon as building is ready, providing additional equipment for larger capacity. Work will be placed under way at once. No estimate of cost announced.

Cleveland, Ohio—The Acme Paper Stock Company, 6204 Central avenue, commercial paper goods, has plans under way for an addition to be used for expansion in storage and distribution facilities. Application has been made to the Board of Zoning Appeals for permission to proceed with erection, and early decision is expected.

Harrison, N. J. — The Wilkata Folding Box Company, 205-17 Tappan street, Kearny, N. J., manufacturer of folding paper cartons and other containers, has leased the larger part of one-story industrial building at Central and Davis avenues, Harrison, owned by United States Radiator Company, and will take over at once. Structure will be improved and occupied for plant, with installation of additional facilities for increase in present capacity.

East Palestine, Ohio—Recent plans for the resumption of operations at the former local pulp mill of the T-H Enterprise Company, have been abandoned, it is said, for the time being, and project will be held in abeyance. A new company, known as Wingwood Pulp and Paper Company, has been negotiating for a lease of the plant and equipment, proposing to continue in the same line of pulp manufacture from waste paper as the T-H company, which operated mill for about three years for such output. The plant is now idle. It is stated that the present abandonment of plans is due primarily to a shortage of manpower.

Wisconsin Rapids, Wis.—Consolidated Water Power and Paper Company, manufacturer of coated and other paper stocks, is awarding miscellaneous contracts for materials for an addition to mill, including contract to Cook & Brown Lime Company, Oshkosh, Wis., for reinforcing steel. Foundations for machinery are now in progress. Structure will be used as a press building, and is reported to cost over $75,000, with equipment.

West Dudley, Mass.—Rhode Island Card Board Company, 163 Exchange street, Pawtucket, R. I., has approved plans for conversion of equipment in power house at mill of West Dudley Paper Company Division, West Dudley, from oil to coal fuel. Contract for work has been awarded to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., and is scheduled to proceed at once. No estimate of cost announced.

Minneapolis, Minn. — The Brown & Bigelow Company, 1286 University avenue, manufacturer of paper specialties, has awarded contract to Charles F. Rule Construction Company, 1281 Taylor avenue, for alterations and improvements in factory at 450 Syndicate avenue, North, to be occupied for a branch converting plant. Work will be carried out at once. No estimate of cost announced.

New York, N. Y.—Morris Boylan, 1420 Brook avenue, Bronx, wrapping and other paper stocks, has leased an industrial building at 1011 Tiffany street, Bronx, and will occupy for storage and distribution service. Possession will be taken at once.

Perth Amboy, N. J.—The Philip Carey Manufacturing Company, Smith street and Victory Bridge, manufacturer of roofing papers, insulating papers and other building papers, has arranged for purchase of tract of about 35 acres of land adjoining plant at location noted, with large frontage on Raritan Bay, heretofore held by the city. The property has riparian rights along the waterway mentioned, and will be used for future expansion by purchasing company. In June, 1941, the Carey company acquired the Pardee Tile Works plant at first noted location, and is now operating a large Eastern branch factory at that place. Main offices are at Lockland, Ohio.

Standardizes Wax Paper Rolls

WASHINGTON, D. C., February 24, 1943—The Director General for Operations has issued Schedule X to Limitation Order L-120 which standardizes and simplifies the manufacture of wax paper household rolls and specifies packaging and packing methods to save paper, paperboard, and shipping space. The last schedule issued was Schedule VI.

The total savings estimated under Schedule X are 7,250 tons of paper and paperboard, plus a saving of 50 per cent in cubic feet of shipping space.

Among the conservation measures in Schedule X are:

1) Reduction of wax paper household rolls to standard weights of 18 pounds and 21 pounds to a ream of 500. This is effected by eliminating excessive varieties in weights and sizes and will bring about estimated savings of 2,500 tons of virgin fibre.

2) Elimination of lengths less than 125 feet because they require packaging material out of proportion to the yardage packed. This will save some 3,500 tons of paperboard.

3) Reduction of the thickness of the cartons to .028 inches. Formerly, boards as heavy as .032 were used. This will save some 500 tons of paperboard.

4) Restriction of the weight of cores on which the paper is wound to 25 pounds per thousand rolls, saving an estimated 250 tons of chipboard.

5) General simplification of packaging and packing, saving shipping space.

There are approximately 20 companies producing wax paper household products. They consume about 50,000 tons of waxed paper annually, or roughly 15 per cent of the total production of waxed paper.

Review T. & H. Calendar

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., February 22, 1943—The 1943 Tileston & Hollingsworth Calendar has been recently reviewed in a number of places with signal success. The announcement for one at the Aurora Hotel, Worcester, Mass., before the Printing House Craftsmen of that city, Thursday evening, February 18, read "Come one!! Come all!! to hear and see the 'Barnum & Bailey' of Advertising—A. V. Howland and his 1943 Tileston & Hollingsworth Calendar Review." The critic, Philip J. McAteer, whose name was not mentioned on the announcement, was referred to as "The Boy Orator of Boston." Mr. McAteer, of the New England Electrotype Company, and past-president of the Boston Club of Printing House Craftsmen, gave an unusual criticism. At this meeting 75 were present.

On Wednesday evening, February 17, before the Providence Club of Printing House Craftsmen in Providence, R. I., Ralph L. Foster was the excellent reviewer. Mr. Foster, vice-president of Livermore & Knight Company, Providence, is a commercial artist, who has spent a lifetime in graphic arts, most of the years as art director for that company. Fifty attended the meeting.

On February 5, at Schraft's West Street Restaurant, Boston, 200 were present, the method at this gathering being an innovation in that the Boston Club of Printing House Craftsmen requested each of the printers to analyze his own job.

Philip J. McAteer, chairman of the Club's Calendar Night, paid a deserved tribute to Arthur V. Howland, who is vice-president and assistant treasurer of the Tileston & Hollingsworth Company, fine paper manufacturers.

Mr. Howland, originator of the calendar idea, prefaced his remarks with introductions, presenting the past critics, now members of the Tileston & Hollingsworth Calendar Critics Alumni Universal Mutually Benevolent Peripatetic and Protective Association, including Charles R. Capon, George L. Welp, Quincy P. Emery, Harry L. Gage and Philip J. McAteer. Mr. Howland had hoped to make the occasion a gala event with a background of girls in crinoline and lace, melodian and old-time harmonies, but the war prevented.

There was plenty of wit and enlivening humor in the various analyses. The sheet, printer and analyst were as follows: January, Alpine Press, Boston, Max Kirshen; February, E. L. Hildreth, Brattleboro, Vt., Philip Hallgren; March, Oxford Print, Medford, Mass., Joseph Kearney; April, Commonwealth Press, Worcester, Hamilton Wood; May, Thomas Todd & Co., Mr. Todd; June, Rand-Avery-Gordon-Taylor, Boston, Gehman Taylor; July, E. A. Johnson Co., Providence, Ferdinand Titworth; August, Capitol Offset Press, Concord, N. H. (not reviewed); September, Taylor Press (in the absence of a Taylor Press representative Mr. McAteer read the review); October, Bradford Press, William Bradford; November, M. H. Davidson & Co., New Haven, F. Davidson; December, Tudor Press of Boston, Ralph Wilbur.

Three critics of past years, George Welp, George Trenholm and Harry Gage, spoke briefly at the conclusion.

Rent Is One Pepper Corn

Since 1928 the British Columbia government has been paying rent for its liquor vendor's store in the pulp and paper company town of Ocean Falls on the basis of the custom established in 1607. The rent is one pepper corn annually.

Pepper corn is defined in the Oxford dictionary as (a) the dried berry of black pepper; (b) stipulated for as quit rent or nominal rent, or very small, insignificant.

The government negotiated the lease with Pacific Mills Limited for a term of 99 years. Other government buildings in company towns were erected on the same terms but in recent years leases call for a one-dollar-year fee.

New Vacation Plan

Under a newly-liberalized policy, the Hammermill Paper Company hourly workers this year will enjoy paid vacations—almost as usual.

The company has announced that all hourly employees, both men and women, are eligible for one week's vacation with full pay and bonus after they have completed but one year of service in the organization. Mill workers start receiving two full weeks with pay when they reach the ten-year service mark.

The almost-as-usual clause in the paper plant's 1943 vacation policy is that many of the workers who are eligible for vacations will be paid the money but will enjoy no time off.

Liberalization of the mill's vacation policy added more than 300 Erie men and women to the list of those eligible to receive paid leaves, it was said.

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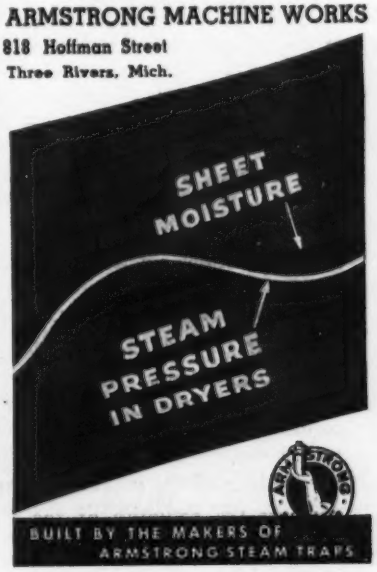

PAPER TRADE JOURNAL

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Henry J. Berger

EDITOR

Vol. 116 February 25, 1943 No. 8

COMING EVENTS IN PAPER INDUSTRY

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

AMERICAN PULP AND PAPER MILL SUPERINTENDENTS ASSOCIATION, Twenty-fourth Annual Convention, Commodore Hotel, New York, June 15-17.

BALANCED ECONOMY

As satisfactory progress in any country can only depend upon the aggregate labor of its workers, manpower is the number one basic factor in meeting both civilian and military requirements. The problem of transition from a normal peacetime status to a wartime basis, is especially dfficult in a large and complex industrial country like the United States. The start is slow and, in view of the pressing time element, progress appears to lag, even when the acceleration toward armaments is actually proceeding at a remarkably high rate. The productive effort of this country in World War I is a record of this transition of our economy.

The problem which confronts the country today is vastly more complex and of greatly increased magnitude than any which has been considered in the past. As the President has said that the United States must serve as the arsenal of democracy to supply military goods, food and armed forces to aid all nations resisting aggression, the entire order constitutes a huge assignment. Great progress has been made, and it is being constantly accelerated. The lack of adequate planning, however, is beginning to reveal the strains and dislocations evident in the national economy. In the opinion of some critics, too much aid has been promised in the size of the United States armed forces, in the amount of military goods and in lend-lease commitments, which consists largely of foods. The opinion of others is directed more particularly to the lack of a central overall planning board, which would assume entire authority and responsibility for the welfare of the nation; a board authorized to coordinate the activities of the Army, Navy and all government agencies which are now functioning to achieve a common objective, that of winning the war as speedily as possible.

The need for such a central authority, it has been pointed out, must soon be more fully recognized than it is at present.

In considering the question of the size of the armed forces or, as perhaps more clearly expressed by persons in uniform, and therefore, not engaged in productive occupations, a new departure from the traditional past is now present. The large number of women enrolled in the auxiliary corps complicates the organization of the country's military machine. It is not necessary to criticize the inclusion of women in their enrolled capacities but it is important to consider their total number as a factor in food consumption, transportation, compensation and the withdrawal of services from civilian life, or womanpower. The question of how large an armed force this country can supply without limiting the production required, is a highly controversial subject. From current reports there is not only evidence of a lack of essential planning but of signs that the home front is being stripped to a serious extent.

As manpower is always the basic factor in a nation at war, it is highly essential to effect the best possible balance between war needs and civilian requirements. If the error is being made, as some critics assert, that too much is being expended for military uses, a better balance to support the home front appears to be the practical solution. More clarity and understanding, rather than more orders and amendments which serves to confuse a perplexed public, would be helpful to a more firmly united home front.

The subject of manpower so largely dominates the scene that it occurs and reoccurs in every consideration of the war effort. Manpower in agriculture is one of the problems which does not now appear will be very satisfactorily solved this year. Food is a number one war requirement, but only until now has its production been given any serious consideration. Too many experienced men from the farms have been drafted into the armed forces and too many are being retained there. Too little fertilizer of high grade is available for growing crops this year; too little essential farm machinery will be available. This situation is so serious that it threatens to create a food shortage if a poor crop year should occur. Nature is not subject to political edict, and where surpluses are too greatly depleted, hardship may result in lean harvest years.

Many crops last year were only partially harvested, and present prospects are not as favorable as they were last year.

A consideration of the food supply situation and the preliminary plans of the Office of Price Administration in its initial step to ration processed foods, is

indicative of the serious nature of the supply of many varieties of food in the future. If this schedule is continued it implies that each person will be permitted to purchase only about one-half the quantity of canned and processed foods formerly consumed. Presumably, each person will be able to purchase all the food required for health by utilizing more of unrationed foods or such foods as are in more abundant supply. The system of rationing will prove one of great inconvenience at first, but as the point system is equitable, it should cause little difficulty after a comparatively short period of use. The adoption of a rationing plan for this country which has and always has produced surpluses, indicates that a balanced economy has not been achieved and that this expedient is calculated as one means of accomplishing it.

Impending general industrial and trade restrictions are indicated in the orders limiting the production and use of paper to an estimated 14,300,000 tons for the current year and wood pulp to about 8,500,000 tons. The most important factors at present are not the size of the armed forces as such, but are production and distribution. An increased utilization of manpower to overcome this current lag may not be entirely successful through voluntary changes in occupations and a mandatory order may be necessary to increase the number of workers and overcome the defects in the present system of hours and the relative low production per man-hour now prevailing.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1943		Corresponding Weeks—1942	
January 9	86.1	January 10	103.5
January 16	88.0	January 17	105.0
January 23	88.0	January 24	105.0
January 30	87.2	January 31	104.3
February 6	87.2	February 7	103.7
February 13	*88.6*	February 14	103.4

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1942	104.5	103.9	102.9	100.4	95.3	87.4	75.8
1943	*87.6*	....	....	....	....	....	....

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1942	80.8	82.8	90.6	86.8	80.1	90.5
1943	....	....	....	....	....	....

COMPARATIVE YEARLY SUMMARIES

	1936	1937	1938	1939	1940	1941	1942	1943
Year to Date..	75.8	89.1	64.5	77.4	88.7	86.5	104.1	*87.7*
Year Average..	80.4	79.8	71.5	83.4	85.6	97.4	90.5	...

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS †

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1937	83	89	89	91	88	80	69	77	72	70	57	47	75
1938	56	63	63	60	60	59	59	60	70	73	67	61	64
1939	65	73	76	74	69	73	68	77	82	91	88	77	77
1940	78	75	74	76	82	85	77	79	78	85	82	77	78
1941	81	88	89	89	91	94	92	98	95	99	98	90	92
1942	102	101	101	95	82	72	68	75	76	81	82	77	84
1943	*86*	..	..	..	..	..	..	..	..	..	..	..	..

Week ending Jan. 9, 1943—82
Week ending Jan. 16, 1943—88
Week ending Jan. 23, 1943—88
Week ending Jan. 30, 1943—88
Week ending Feb. 6, 1943—89
Week ending Feb. 13, 1943—*87*

† Per cents of operation based in "Inch-Hours" reported to the National Paperboard Assn.

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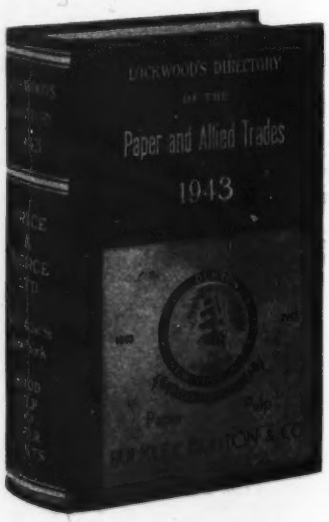

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Edited by R. G. Macdonald, Secretary

Rayon and the War*

By Dan B. Wicker[1]

Abstract

War economy and military needs have placed heavy demands on the domestic rayon industry. To meet these demands there have been extensive increases in output and wide diversifications in properties to fulfill new and broadened use requirements. Stability has been maintained in spite of changing economic conditions. These factors may be expected to have a permanent influence upon the direction of the industry's future developments.

Since the beginning of the current conflict rayon has contributed to a highly important extent to the country's general welfare. Not only have there been increased demands for its former normal peace time uses, but also for military uses and for replacing natural fibers of limited or uncertain supply.

The dwindling of rayon imports to the vanishing point has transferred to the domestic industry the responsibility of providing increased output to prevent serious shortages and economic upsets. In addition, diversion of natural fibers to war service, and reduction of imports reduced the amounts of such fibers for civilian needs. As a consequence there has been a greatly enlarged use of rayon in the manufacture of woolen, worsted, linen, and other types of fabrics for civilian needs.

There have also been progressively increasing uses of rayon products to fulfill direct war requirements. High tenacity rayon is serving the armed forces excellently for heavy duty truck and airplane tires, uniform and helmet linings, parachute troop uniforms, self-sealing gas tanks, neckerchiefs, insignia, special electrical insulation in planes and submarines, and in other ways.

Accordingly, the impact of war economy and war needs has affected the direction of the development of rayon, both with regard to quantitative output and to diversification of use requirements. These results may be expected to have a far reaching tendency toward broadening the consumer base of wood products as converted to synthetic textile fibers.

War Demand for Rayon

Due to the emphasis which has in the past been placed upon the esthetic qualities of rayon it has, in some quarters, become looked upon as a luxury material of little or no military significance. However, its place as a basic war and peace time commodity is strikingly exemplified by the world production trends from 1936 to 1940. Table I gives figures for yarn and staple fiber over a period during which reliable comparative figures are available. The accelerated production, particularly of staple fiber, in the totalitarian countries can be safely assumed to be entirely a measure of war economy. It is interesting to note that the trend of production continued upward even after the beginning of hostilities, except in insular countries where there was probably an interference with sources of raw materials.

TABLE I

Pounds of Rayon Yarn Production—Add 000	1936	1937	1938	1939	1940
United States	277,640	321,680	257,625	328,625	390,070
Germany	99,050	125,000	140,000	160,000	250,000
Japan	275,000	334,350	209,600	239,350	225,000
Great Britain	116,000	119,700	106,450	120,000	100,000
Italy	86,000	106,550	101,425	119,000	100,000
Others	168,805	192,680	173,170	178,520	78,890
Total	1,023,305	1,199,960	988,270	1,145,495	1,143,960
Pounds of Rayon Staple Fiber Production—Add 000					
United States	12,300	20,245	29,860	51,315	81,100
Germany	94,800	219,200	330,000	440,000	575,000
Japan	45,850	174,250	375,000	309,500	300,000
Great Britain	26,160	32,720	31,745	60,000	50,000
Italy	110,100	156,350	166,885	191,000	225,000
Others	9,385	16,440	24,125	30,180	5,750
Total	298,594	619,205	957,615	1,081,995	1,236,850

Although production was increasing in other regions, the military situation was also changing rapidly in such a manner as to reduce shipments to the western hemisphere. For example, Table II gives a summary of rayon imports received in the United States from 1936 to 1941.

Imports from Britain continued at a high level after those from other countries virtually ceased. However, losses suffered in 1941 through enemy action in Liverpool and at sea, together with reduced production and general loss of contact with the American market directed British attention to Canada and to fabricating the staple fiber in England and exporting the fabric. With the entry of the United States into the war all imports of rayon yarn and staple fiber ceased.

American Production

Under the influence of dwindling imports the American industry took up the responsibility of domestic demands to produce in 1941 451,204,000 pounds of yarn and 122,025,000 pounds of staple

TABLE II

U. S. Imports of Rayon and Staple Fiber	Rayon Yarns, lb.	Staple Fiber, lb.
1936	255,000	12,721,000
1937	872,000	20,614,000
1938	262,000	23,197,000
1939	176,000	47,403,000
1940	45,000	17,736,000
1941	7,000	11,600,000

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 15-18, 1943.

[1] Member TAPPI; Pilot Plant Superintendent, American Viscose Corp., Nitro, W. Va.

fiber; in 1942 the estimates are 479,300,000 pounds of yarn and 153,300,000 pounds of staple fiber.

Meanwhile the war had also brought about radical changes in the Latin American rayon situation and domestic rayon producers are now, in furtherance of the "Good Neighbor Policy," under obligation to set aside 4% of their output for the needs of these countries. This Government sponsored export policy may have an influence upon future extended export sales. However, new industries are springing up in these countries and present unsettled conditions would make any prediction premature.

To summarize, the figures on wood pulp consumption by the domestic rayon industry, as given in Table III should be illustrative of production trends and of considerable interest to pulp producers.

TABLE III

Wood Pulp Consumption by the U. S. Rayon Industry

Year	Tons	Year	Tons
1930	72,000	1936	151,000
1931	84,000	1937	176,000
1932	74,000	1938	147,000
1933	115,000	1939	194,000
1934	112,000	1940	238,000
1935	137,000	1941	287,000

Increased Demand for Normal Uses

Of the vastly increased production of rayon, fully 100,000,000 pounds was not due to any major new developments in the fiber itself. It reflected, first of all, the normal expansion of regular rayon markets already established and second, the increasing demands made on rayon by the various and rapidly expanding war agencies. The services required large yardages of fabrics for helmet linings and still more yardage for neckerchiefs. Large orders were placed for hat cords; arm band insignia; chevrons; and other service decorations, all made with standard types of rayon.

In addition War Production Board Order M-37-6 directed domestic producers of rayon yarns to make daily allocations as follows:

Viscose and Cuprammonium Yarns. 1% to be reserved and held for disposition according to specific allocations; 1% to be made available to domestic manufacturers of products other than hosiery to replace their former consumption of yarn-dyed silk; 15% to be made available to domestic manufacturers of hosiery, to replace their former consumption of silk and nylon.

Acetate Yarn. ½% to be held for disposition according to specific allocations; 5½% to be made available for domestic manufacturers of any textile product to replace their former consumption of silk and nylon. All of these uses required large volumes of regular or ordinary types of rayon with which the trade is generally familiar.

New Rayon Yarn Use Requirements

Before the present emergency arose, special types of rayon had been developed which are characterized by their high strength, toughness and stability. These have proved to be of particular value in the conduct of the war.

Perhaps the most spectacular contribution is that of heavy duty rayon cord tires. The cords in these tires are made of the high strength, continuous filament, viscose rayon yarn. Due apparently to their smoothness, as compared to short fibered spun yarns, less internal frictional heat is developed. As a consequence there is less deterioration both of the tire fabric and of rubber, especially during the severe service of heavy trucks and buses.

Another important property lies in the fact that these strong rayon tire cords withstand shock very well and show much higher strength when a load is applied suddenly than when it is applied slowly and gradually. The strength of these rayon fabrics permits tires with thinner side walls, entailing not only a highly essential saving of critical rubber but also less total weight per tire. These facts have proved to be major considerations in the adoption of rayon tires for heavy bombers and other war and peace time aircraft.

Another adaptation of strong rayon yarn is use in fabrics for self-sealing gas tanks; the fabric serves as an effective support for the soft sealing plastic.

Strong rayon yarns are also used in making a fabric known as "Tackle Twill." This has the strong rayon in the warp and cotton in the filling, with a weave which exposes only the slippery rayon on one surface. Prior to the emergency the fabric had given such good service on football fields that it was adopted by the Army as standard equipment for its parachute troop uniforms. The primary considerations were its strength, smoothness and resistance to snagging and wear.

Larger and larger quantities of these strong rayons are being demanded for war equipment so that the industry, under direction from the War Production Board, is in process of plant conversions to permit substantial increases in the output of such high tenacity yarns.

Staple Fiber for Carpets

For some time before war conditions arose the rayon industry had been conducting cooperative research with some of the more progressive carpet manufacturers with the objective of adapting staple fiber to use in floor coverings. The first discouraging results clearly indicated that it was necessary to develop a new type of staple having physical properties and mechanical dimensions which are specifically suited to the use requirements of carpets. Accordingly, adjustments were made in the staple denier, length and lustre to arrive at combinations which performed satisfactorily in the textile process and in use, and had light refracting properties resulting in the most pleasing color effects.

A long series of experiments resulted in a new staple type with physical properties modified in such a manner as to produce an exceedingly tough fiber of adequate tensile strength. The result of these modifications was a carpet staple which has been found to be superior to carpet wools both with regard to wear life and soiling properties.

There are two well known types of viscose carpet staple in use, namely "Tufton" and "Fiber D." Diminished wool imports has seriously increased the demand for such staple. However, due to rationing of rayon output, only 2,000,000 pounds per year has been available to the carpet trade. As a consequence some floor covering manufacturers have been forced to use textile materials which are not best adapted to the purpose. This situation is in process of alleviation and will doubtless disappear when the necessity of war restrictions is removed.

Staple Fiber for Wool Conservation

Wool Conservation Order M-176, which became effective August 3, 1942, directed that each producer of viscose or acetate staple fiber should set aside each month such an amount of his production, in excess

of priority rated orders, as would be designated by the Director General for Operations for sale to persons processing wool. This staple is then allocated by the Director General among persons eligible to purchase it. During the current year the amount so allocated will probably exceed 15% of the staple fiber available for civilian use. Accordingly, there are being offered for nonwar purposes larger quantities of blended fabrics varying in rayon content from 20% to 65%. Also, rayon staple fiber is specified in certain officers' uniform cloth.

These steps have been taken with the primary objective of conserving available wool supplies against military needs in the several severe climates in which we and our allies must conduct operations. However, a secondary effect has been to accelerate the introduction of rayon staple into fields which had theretofore been very conservative in taking advantage of the versatility and improved processing performance of this textile raw material.

It is well known that the characteristics of the natural fibers are susceptible to only very limited control while those of synthetics can be varied at will in a number of respects. Among the controllable variables of rayon are filament diameter, length, crimpiness, lustre, tensile strength, extensibility, soil resistance, chemical composition and dye affinity. Accordingly, considerable experimentation is in constant progress to modify these properties for meeting new specific trade requirements, for improving processing characteristics and for developing new applications and improved style effects.

War economy has created a demand for large quantities of fabrics of standard shades having a high degree of color fastness. In response to this demand rayon has offered the "spun-dyed" type. By taking advantage of ability to incorporate coloring materials prior to, or during, the formation of the filaments, rayon manufacturers have produced shades of such fastness that the color can be removed or faded only by treatments so drastic as to destroy the utility of the material. These types of rayon offer considerable future promise, especially in the field of staple fiber where the process of blending permits a wide variety of shades and cross dyeings to be produced with a limited number of standard colors.

Rayon as a Stable Commodity

The beneficial effects of economic stability upon national morale and well being cannot be overestimated. In this regard rayon has made its contribution. During the past few years the natural textile fibers have, under various market, governmental and partisan influences, experienced wide fluctuations in price until finally brought under Office of Price Administration control. In contrast, rayon filament yarns have, since the beginning of hostilities, experienced only minor price readjustments and viscose staple fiber has maintained an absolutely stable price since 1937. The extent of the industry's efforts to offer its consumers a stable source of supply has been previously pointed out.

TAPPI Notes

The Glens Falls Chapter of the Empire State Section of TAPPI will meet at the Queensbury Hotel on Thursday evening, March 4th. R. T. Barnes of the International Nickel Company, will talk on metals and alloys.

The Delaware Valley Section will meet at the Engineers Club, Philadelphia, Pa., on Friday evening, March 5. Arno W. Nickerson, Consulting Engineer, New York, N. Y., will discuss formation.

Earl W. Kendall, formerly of the International Correspondence Schools, is now in the Division of General Research of the Hercules Experiment Station, Wilmington, Del.

The State of Michigan was well-represented when Harry Fletcher was awarded the TAPPI Medal in connection with the Annual Luncheon of the Technical Association of the Pulp and Paper Industry at the Hotel Commodore, New York, N. Y., on February 18, 1943.

In addition to Michigan-born OPA Administrator Prentiss M. Brown as principal speaker, there were folks from the Wolverine State sprinkled throughout the entire ballroom. Among them were three members of the armed forces who had come in from Mitchel Field to see Harry Fletcher receive the coveted award. Heading the trio was Brig. General Willis R. Taylor, Commanding General, First Fighter Command, Mitchel Field. General Taylor and Harry Fletcher have been lifelong friends, the former having spent a great deal of his training period throughout Michigan and a goodly portion of it at Alpena. With General Taylor, in addition to his aide de camp, Capt. James Dickey, was Lieut. Ben G. Wright, who had been associated with Mr. Fletcher in civic life when he, Wright, was manager of the Alpena (Michigan) Chamber of Commerce.

General Taylor, as Commanding General of the First Fighter Command, is charged with the Air Defense of the Eastern Seaboard.

The F. N. Burt Co., Inc., was the exhibitor of the material listed under the Bryant Paper Company's name, PAPER TRADE JOURNAL 116, No. 7:120 (Feb. 18, 1943). The Bryant Paper Company participated with special lightweight papers on display.

Training Employees As Job Instructors

To provide the executive with a guide for outlining a specific plan and program for training job instructors in his own company, the Metropolitan Life Insurance Company has issued the report *Training Employees as Job Instructors.*

This handbook of training principles and practices, based on a survey conducted by the Metropolitan's Policyholders Service Bureau, discusses such important questions as the selection of job instructors, the time and place for their training, the consequences of inadequate training, the cost of training and many others that concern executives. Included in the report are samples of training programs now in operation in war production industries.

The report is based on interviews and correspondence with Federal and State Agencies, consultations with private companies, and actual use of the training method by the author in the plants of several companies. An appendix to the report lists references dealing with the job instructor training activities of some 21 war production companies with thumbnail sketches of the training problems encountered. An executive interested in the subject dealt with by Training Employees as Job Instructors may obtain a copy direct from Policyholders Service Bureau, Metropolitan Life Insurance Company, One Madison Avenue, New York City.

The Photochemical Stability of Papers*

By Herbert F. Launer[1] and William K. Wilson[1]

Abstract

Papers were irradiated with a carbon arc through a filter which completely eliminated infrared, and ultraviolet shorter than approximately 330 mμ. Sheet temperature was kept near 30° C. during irradiation, through contact with a thermostated metal backing, thereby eliminating heat effects, shown otherwise to overshadow light effects, using intense sources.

In consequence, results differed from those of previous workers. Yellowing of papers (without lignin) commonly ascribed to light was found to result from heat or age but not light; papers bleached, when heat effects were eliminated, during irradiation. Even lignified paper was bleached by light in nitrogen.

Paper scorched brown at high temperatures or yellowed at 100° C. and yellow papers 250 years old, were bleached by light.

Lack of oxygen inhibits but does not altogether prevent photochemical deterioration. The role of water vapor differs fundamentally for cotton and wood-pulp paper.

Lignified paper is very unstable to light. Printers' ink extensively protects paper.

Irradiated papers are subsequently less stable in the dark than those not previously irradiated.

The order of photochemical stability of papers was as follows: new rag, refined sulphite, old rag, soda-sulphite, and newsprint. The light stability of new rag papers was greatly affected by acid and rosin, whereas that of old rag and soda-sulphite was only slightly affected, in contrast to heat stability, for which pH is important for all fibers. Newsprint, made neutral with $NaHCO_3$, showed a large increase in light stability. Rosin did not seriously affect stability of any papers as long as acidity was low.

The effect of light upon paper is one of the most important problems in the preservation of valuable records. Irreplaceable documents are being exhibited under conditions which may be unnecessarily adverse. This investigation was undertaken as a part of the general program of research at the National Bureau of Standards for the preservation of records, and deals with the factors influencing the light stability of white record papers, not only as regards atmospheric conditions but also with respect to paper components. A third phase of the subject, namely the relative deterioration occurring at various wavelengths of the spectrum to which papers are ordinarily exposed, is still in the process of investigation.

The stability of papers toward various types of light has been the subject of previous investigations. Richter *(1)* exposed a variety of papers, differing in kinds of fiber and sizing, to direct sunlight, and in a few experiments to a quartz-mercury arc, and measured the consequent changes in folding endurance, and to a lesser extent, changes in chemical characteristics. Edge and McKenzie *(2)* measured changes in the reflectance of wood-pulp papers exposed to direct sunlight, a quartz-mercury arc and a carbon arc. Oguri *(3)* measured the changes in copper number of a tissue paper and a filter paper caused by a quartz-mercury arc. The effect of sunlight upon newsprint was studied by Bakker *(4)*.

It is evident, however, that these types of light do not correspond to the light to which papers are normally subjected—namely, diffused indirect daylight transmitted by window glass or tungsten incandescent-lamp light. The exact duplication of sky light as transmitted by window glass is not necessary for a study of the effects of normal lighting upon papers, nevertheless certain objectionable characteristics of direct sunlight or of the usual high intensity sources can be eliminated. The ultraviolet region of sunlight extending from 290 to 330 mμ, shown by Richter *(1)* to account for almost half of the effect of sunlight upon paper, is normally excluded by window glass and, therefore, has no counterpart in interior daylight. Also, Oguri *(3)* has shown that over 90% of the radiant energy from a quartz-mercury arc harmful to paper is excluded by window glass.

Intense sources, including direct sunlight, furthermore, give rise to temperature effects which have no counterpart in interior daylight. The high temperatures attained by sheets of paper during irradiation with powerful light sources was discussed by Launer *(5)*.

Köhler *(6)* exposed some papers covered with various colored glasses to north-sky light, as well as to direct sunlight, and thus, in the former procedure, avoided the objection mentioned. The purpose of his investigation, however, was to select a protective window glass for the archives at Stockholm from various commercial products, rather than a study of factors affecting stability of papers. The study was limited to three papers, for which changes in folding endurance was measured. Changes in copper number for one paper during the 128-day period of exposure were also measured. The changes during this period were quite large, owing to the rather poor quality of papers used, since the best, a rag paper, had an initial copper number of 1.6.

In the present investigation a large number of experimental book and writing papers, produced in the paper mill at the Bureau, as well as commercial newsprint paper, were irradiated under conditions that were rigidly controlled. The papers, which embodied large differences in kind and quality of fiber, content of lignin, rosin, and other sizing materials, acid and filler were maintained near 30° C. (30° to 32°) during irradiation. All unusually short and long wavelengths were excluded by a special filter combination. The relative humidity was fixed at a definite value, except when moisture or oxygen content was intentionally varied.

In the present work, it is believed that the conditions under which light usually affects white record papers have been attained more nearly than heretofore, and that the results dealing with the factors influencing the light stability, the permanence of papers once exposed to light, and the color changes in papers caused by light, are representative of the

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 15-18, 1943.

[1] National Bureau of Standards, Department of Commerce, Washington, D. C.

behavior of record papers under the most prevalent conditions of use.

Apparatus

A commercial arc lamp with ½-inch electrodes of solid carbon, enclosed in Pyrex, operating at 2080 watts and 16.5 amp. was used in all experiments. The flame of the arc was 15.8 cm. from the center of the sheet during irradiation. In combination with this lamp, a liquid filter *(5)* consisting of a glass cell, made up of one sheet of Corex-D glass and one sheet of ordinary window glass, and through which was pumped a 0.117-molar solution of cupric chloride to remove the infrared, was used. The radiant energy thus reaching the papers consisted essentially of the strong cyanogen band at 389 mμ *(7)* superposed on a black-body continuum arising from the incandescent positive electrode, and did not include any radiant energy having a wavelength shorter than approximately 330, nor longer than 750 mμ.

The spectral distribution of this light and that of the sky light (eastern sky at 2:15 P. M. on a clear day, April 23, 1942) entering the laboratory through windows was studied by the method of transmission through glass filters having sharp cut-offs and known spectral transmission curves. A two-photocell balanced circuit with potentiometer (for the arc light, an automatic recording potentiometer) was used for measuring transmissions. It was found that 80% of the filtered arc light lay in the region between approximately 330 and 440 mμ. Of the sky light, 25% was found to lie in this region and less than 0.1% in the infrared region beyond 750 mμ.

Inasmuch as the light usually affecting papers is in the region[2] between approximately 330 and 440 mμ, and since the filtered arc light included neither the shorter ultraviolet nor infrared, it is probable that the light used in this work differed from normal lighting, in its effect upon papers, mainly in intensity.

The remainder of the apparatus and its effectiveness were previously described in detail by Launer *(5)*. Principal emphasis was placed on control of the temperature of the paper during irradiation. The temperature of the sheets was maintained near 30° C. by intimate contact, through suction with a thermostated aluminum backing, supplemented by the removal of most of the undesired infrared. The air which continually flowed through the sheets during irradiation was kept at constant moisture content corresponding to a relative humidity of 58% at 30° C. For experiments in which moisture was practically excluded, the air was dried to a relative humidity not higher than 0.015%, by continuous circulation over anhydrous magnesium perchlorate. For experiments in which oxygen was practically excluded, dry nitrogen was continuously circulated over copper gauze at 500° C., giving a constant of O_2 of less than 0.03%. For one experiment the content of O_2 was probably much lower than this figure, because a small glass irradiation chamber was substituted for the usual large one to reduce leakage of O_2 into the system by diffusion.

These were the usual conditions of irradiation. In a few comparison experiments the cupric chloride cell and paper thermostating arrangement were omitted. The distance from the arc to the sheet was changed in certain experiments. Papers were usually irradiated on one side of the sheet, although in many experiments both sides were irradiated. Departures from the usual conditions are stated in each instance.

[2] Unpublished findings of the present writers.

Samples Studied and Methods of Analysis

Thirty-one representative white, undyed book and writing papers produced in the semicommercial paper mill at the National Bureau of Standards from a variety of commercial materials were used for study. The pertinent characteristics of the papers are listed in the tables accompanying this publication. The papermaking details were given in other publications of the Paper Section *(8)*. One commercial newsprint paper was also included in the study. This paper may be considered as representative of highly-lignified papers in general, and was very useful because of the large chemical changes caused in it by relatively mild exposures to light. Some very old commercial papers were used in a few experiments.

The names of the various types of papers are those current in the paper industry and probably require definition: "New rag" is obtained from unused cotton fabric and represents a type of cellulose with relatively large stable molecules. "Old rag" is used cotton fabric which has been bleached, often drastically, to remove colors, and represents a type of cellulose with smaller molecules arising from this treatment and from the wear and washing of the fabric as a garment. Soda and sulphite pulps are produced from wood by alkaline and acid treatments, respectively, to remove lignin. These represent the cheaper grades of pulps used for record papers and contain substances other than cellulose which produce yellowing and deterioration of the paper with age. "Refined" sulphite, therefore, is sulphite pulp which has been subjected to treatments designed to remove the substances other than cellulose, and is thus a more stable material. Newsprint consists largely of groundwood containing the original lignin.

Various test methods to determine the extent of deterioration caused by light were employed. The volumetric alpha-cellulose method was found to be the most generally useful. pH (cold extract) and resin were also determined. These three methods were described by Launer *(9)*. Fluidities of dispersions of cellulose in cuprammonium solution were measured *(10)* in a number of instances. Copper number and folding endurance *(11)* were also determined.

Since the values for copper number merely substantiated the alpha-cellulose results, they are omitted except in a few cases of particular interest. The values for folding endurance were also omitted, inasmuch as they also substantiated the alpha-cellulose results but with far less precision owing to the nature of the test. In general, after 17 hours of irradiation, the rag papers had retentions of folding endurance upward of 75%, whereas the soda-sulphite papers ranged between 50 and 85%.

Although the alpha-cellulose results as determined by the method employed are practically independent of the presence of lignin in most analyses, this fact had to be confirmed for control analysis for the action of light. Therefore, a sample of irradiated newsprint was analyzed for alpha-cellulose by both the volumetric and gravimetric method. Because in the gravimetric method the amount of lignin present

must be corrected for, the lignin content was determined by the method of Ritter and Barbour *(12)*. Certain other lignin analyses were also carried out using this method. Starch and glue *(11)* were also determined in a few instances.

The irradiated area of each sheet was 20 × 20 cm. pH, resin, and folding endurance were determined from strips; other tests were made on ground papers. Two and often three sheets of the same paper were irradiated, one at a time, to make possible all of the tests desired, and to check and sometimes recheck experimental results.

Experimental Results and Discussion

Changes in papers during irradiation

Inasmuch as stress in this investigation was laid upon the study of effects of light alone, as contrasted with the light-plus-heat effects usually obtained using high-intensity sources including direct sunlight, it is of interest to compare changes in papers during irradiation under these two conditions. It was previously shown *(5)* that various sheet materials, including paper, attain abnormally high temperatures when irradiated with a commercial carbon arc lamp under conditions similar to those of the usual "light" stability tests.

Chemical deterioration by heat during irradiation. Two series of experiments were conducted which differed essentially in that the temperatures of the sheets were maintained near 30° C. in one series, thus precluding measurable thermal deterioration, whereas in the other series the temperatures were not controlled.

The sheets in both series were placed 25 cm. from the flame of a Pyrex-enclosed carbon arc operating at 2080 watts. No attempt was made to exclude the infrared in these experiments. The radiant intensity incident upon the sheets was 0.4 watt/cm.^{2}, as measured with a calibrated thermopile-recorder system, described by Launer *(5, 13)*.

The results presented in Table I show that extensive deterioration due to heat took place if the sheet temperatures were not controlled during irradiation with an arc lamp. The effect of heat may be several or many times greater than that of light.

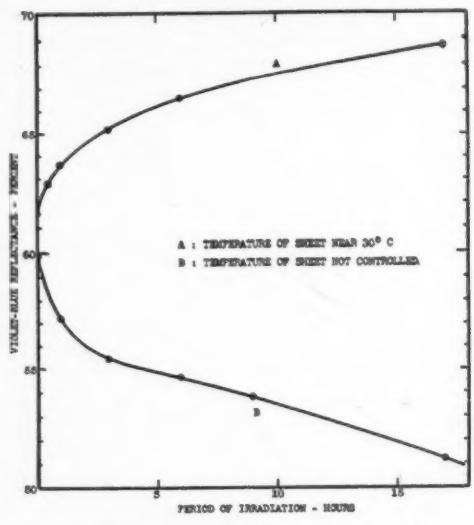


FIG. 1

Color changes in paper irradiated with and without temperature control, using the carbon arc.

Color changes arising from heat and from light. The yellowing of paper upon exposure to "light" is a familiar phenomenon. Richter *(1)* reported a yellowing of all the types of papers studied, including rag, purified and ordinary wood pulp, sized and unsized, during a 100-hour exposure to Miami, Florida, autumn sunlight. Sunlight, however, was used in the early days of papermaking to bleach papers.

TABLE I.—THE PREDOMINANCE OF HEAT EFFECTS OVER LIGHT EFFECTS DURING IRRADIATION[a] WITH THE CARBON ARC LAMP WHEN SHEET TEMPERATURES ARE NOT CONTROLLED

Paper No.[b]	Decrease in alpha-cellulose percentage: Conditions: Sheets freely suspended. No temperature control[c]	Decrease in alpha-cellulose percentage: Conditions: Sheets in intimate contact with aluminum backing. Temperature near 30° C.
1129 (soda-sulphite)	54.7	3.6
1134 (soda-sulphite)	31.2	3.8
1191 (old rag)	4.5	1.1
1215 (old rag)	3.7	1.3

[a] The papers were irradiated for 17 hours at a distance of 25 cm. from the arc, with the same incident radiant intensity in each experiment. Moisture content of the sheets was not controlled. See text for further details.

[b] See Table III for further details of these papers.

[c] From the results previously published by one of the writers *(5)* it is estimated that the temperature attained by the sheets under these conditions was between 160° and 200° C.

These opposite effects, bleaching and yellowing, were observed by Edge and McKenzie *(2)* with papers made from wood pulp and irradiated with sunlight. For eight papers, sunlight in England caused much more bleaching and less yellowing than the sunlight in the warmer and more humid Cairo, Egypt. Portions of the papers exposed in Cairo had been covered with an opaque paper. These covered portions, which were thus subjected to approximately the same heating as the exposed portions, yellowed more than the exposed portions. Specimens of the same papers when exposed to a quartz-mercury or carbon arc, yellowed extensively.

In the present investigation it was found that all the papers, excepting one containing appreciable quantities of lignin bleached when irradiated in air when the temperature was maintained near 30° C. during irradiation, but all of them yellowed during irradiation when the temperature was not controlled.

A typical example of these two opposing effects is shown in Fig. 1 for paper 1129. Both Sheets A and B were irradiated at 25 cm. from the flame of the same Pyrex-enclosed arc. Sheet A was maintained near 30° C.; Sheet B was freely suspended without temperature control, as in the usual commercial "light" stability testing equipment. The extent of yellowing or bleaching was determined by measuring the reflectance of a particular area of each sheet for violet-blue light (the 405- and 436 mμ Hg lines, together) in an apparatus previously described elsewhere *(14)*.

The two competing processes, bleaching and yellowing, are thus shown to have occurred simultaneously, the net observable effect indicating whether light or heat changes predominated. Thus, if a white paper turns yellow when irradiated, it may be inferred that reactions other than photo-chemical ones have played the dominant role.

These remarks do not apply to papers containing appreciable quantities of lignin, for this material caused yellowing of paper even in the absence of heat effects. Extensive yellowing occurred in newsprint when irradiated under the usual conditions at 30° C.

in air. This yellowing resulted from the lignin and was obviously different from the yellowing of cotton fibers containing no lignin, or the yellowing of delignified wood fibers, such as in paper 1129 and the other soda-sulphite papers which contained less than 0.5% lignin. When, however, the yellowing due to lignin was prevented by lack of oxygen, the cellulose fibers in newsprint were bleached by light. This yellowing and bleaching of newsprint by light is shown in Table II, experiments *N* and *N*-noO_2.[3]

It was found that mild heating yellowed all of the types of papers, especially those that had been bleached previously by light. Table II shows the yellowing produced in papers by heating at 100° C. for 72 hours in a dark oven. The color changes correspond, in general, to other chemical changes caused by heat: 1133 showed the smallest color change and also the lowest change in alpha-cellulose percentage (some alpha-cellulose changes caused by heat are given in Table XII).

It is of interest to note from Table II that the yellow color caused by heat could be bleached out again by light, and that the bleaching caused by light could be nullified by heat, depending upon which process predominated.

The yellowing effect of heat was found to be large if the paper was previously (or concurrently) irradiated, especially if the irradiation took place in the absence of water vapor, as in experiment 1138—no H_2O. In this instance, the area of the sheet which had been exposed to light turned much yellower during heating than the borders of the sheet which had not been exposed to light, since they were covered by the clamping mechanism during irradiation.

Thus, papers which are irradiated with strong light sources, including sunlight, without effective temperature control of the sheet, yellow owing to heat, assisted by the desiccation caused by the heat prevailing in the sheet during irradiation.

Another sheet of 1138 which had been irradiated in the absence of water vapor and then not used for further experimentation was stored in a cool dark place. After 15 months it was found to have yellowed markedly in the areas that had been irradiated, but not in those covered by the clamping mechanism during irradiation. In this instance, age instead of heat had caused the irradiated paper to yellow. This probably explains the yellowing observed by Köhler *(6)* in papers exposed for 128 days to north-sky light under which conditions heat effects were probably negligible. Thus, light did not cause papers (containing no lignin) to yellow, but the irradiated fibers underwent relatively rapid changes with age—more rapidly at higher temperatures—which were not photochemical and which confuse the study of the direct effect of light upon paper. This stresses the fact that direct light effects must be studied not only in the absence of heat effects, but also in the absence of age effects—i.e., the light must be of sufficient intensity to cause a change rapidly enough to render concurrent age effects negligible.

Water vapor and oxygen were found to play an important part in the bleaching of paper by light inasmuch as the lack of these gases greatly decreased the extent of bleaching in experiments 1138—no H_2O and 1138—no O_2, although other reactions were not inhibited by the lack of water vapor, as seen from the subsequent extensive yellowing by heating. Paper 1138—no O_2 yellowed much the same upon subsequent heating as if it had not been previously irradiated (*see* 1138 column 6 of Table II).

The bleaching effect of light was observed also in the case of papers yellowed with relatively great age or scorched at high temperatures. One paper, manufactured before the year 1700, was of a blotched brown, another, made before 1791, was of an even, deep yellow color, and a third was an experimental handsheet, made from refined sulphite pulp, containing a thermojunction to permit measurement of the sheet temperature on exposure to a carbon arc lamp. This third paper had attained a temperature of 280° C., as shown in a previous publication *(5)*, and had been scorched to a brown color in a few minutes. These three papers, when exposed to the light at 30° C., bleached extensively. The scorched paper nearly regained its original whiteness, whereas the second paper became as white as a bleached new rag paper. The three papers with color changes are listed in Table II as *p*-1700, *p*-1791 and *p*-280°, respectively.

This effect may have practical significance for documents discolored by age or heat; bleaching may greatly heighten the contrast and permit more legible

[3] An extremely low concentration of oxygen was probably attained in the latter experiment, because the irradiation took place in a small, all-glass chamber which was substituted for the large chamber usually used *(5)*. The former experiment, with air, was also performed in this apparatus for purposes of comparison. In both cases, the usual stream of conditioned circulating gas served to cool the rather limited area of paper.

TABLE II.—EFFECT OF LIGHT AND HEAT UPON THE VIOLET-BLUE REFLECTANCE[a] OF PAPERS

Paper No. and Experimental Conditions	Kind of Paper	Effect of light,[b] then heat[c] — Reflectances, per cent			Effect of heat, then light — Reflectances, per cent		
		Original	Light 40 hours[d]	Heat	Original	Heat	Light 17 hours
1138	soda-sulphite	61.2[e]	71.3	58.1	63.6[e]	56.8	66.6
1138—No H_2O	soda-sulphite	61.2[e]	63.2	49.7	...	...	...
1138—No O_2	soda-sulphite	59.2[e]	62.8	54.2	...	...	...
1133	soda-sulphite	55.5	66.6	59.2	55.5	52.6	...
1143	soda-sulphite	56.7	66.1	...	57.0	53.2	62.0
1173	soda-sulphite	70.6	79.1	...	69.6	65.7	...
1182	new rag	74.2	77.2	68.8	74.2	69.2	75.1
1183	new rag	75.8	77.6	71.3	75.8	72.5	...
1203	old rag	73.3	77.4	69.3	73.4	69.1	75.8
1215	old rag	77.9	80.8	...	78.0	77.0	...
1164	refined sulphite	73.6	76.1	70.5	73.8	70.4	70.8
1166	refined sulphite	73.2	75.6	69.8	...	...	...
N	newsprint	46.0	34.0	...	...	...	...
N—No O_2	newsprint	45.8	51.0	...	...	...	...
p-1700	rag, very old	32.0	53.4	...	...	...	...
p-1791	rag, very old	46.8	65.7	...	...	...	...
p-280°	sulphite—scorched	36.0	53.7	...	...	...	...

[a] The reflectance at 45° from normal incidence, for the combination of the two mercury lines, 405 and 436 mμ, was measured as described in a previous publication *(14)*.

[b] The light was that of the arc lamp under the usual conditions of irradiation, for the time periods given at the head of the two columns, excepting newsprint, which was irradiated for 10 hours in these experiments.

[c] All heating took place in air in the dark at 100° C. for 72 hours.

[d] 20 hours on each side of sheet.

[e] These values are the reflectances of a particular area, 30 × 58 mm., of different sheets of the same paper. The measurements were always confined to exactly the same area, and the values were reproducible to within 0.2% reflectance.

photographs to be made. This method of bleaching, of course, has the drawback that the light concurrently causes deterioration of the cellulose.

Light stability of papers

Amount of light absorbed, and method of its measurement. Only the light absorbed by a sheet of paper can cause deterioration, the extent of which is a function of the amount of light absorbed, all other factors being equal. Values for the percentage of light absorption and decreases in alpha-cellulose percentage for the papers are listed in Table III.

TABLE III.—INFLUENCE OF VARIOUS FACTORS UPON THE LIGHT STABILITY OF PAPERS [a]

No.[b] of Paper	Filler, etc.	Rosin [c] %	pH [d]	Light absorption %	Decrease in alpha-cellulose [e] percentage during irradiation: 17 hr.	40 hr.[f]	Lowering of pH [g]
Papers made from New Rags							
1177	10-13% clay	0	5.6	12	1.0	2.0	0.0
1178	10-13% clay	0	5.1	12	1.6	4.0	.0
1179	10-13% clay	1.4	6.0	21	1.0	2.6	.2
1182	10-13% clay	1.5	4.8	20	4.2	5.5	.3
1183	10-13% clay	.6	5.8	15	1.7	3.4	.5
1186	10-13% clay	.7	4.8	21	3.0	3.7	.1
991	None	0	6.9	10	.8	..	.4
991	None; 2.1% glue	0	6.1	13	1.1	..	.4
1013	None	1.0	6.2	16	1.2	..	.8
1013	None; 1.9% glue	1.0	5.6	17	1.4	..	.6
1013	None; 1.8% starch	1.0	5.8	13	1.0	..	.5
Papers made from Old Rags							
1191	12% clay	0	6.8	16	3.2	5.3	.4
1193	12% clay	0	5.0	16	2.9	6.2	..
1200	12% clay	1.2	6.1	18	3.5	6.2	.8
1203	12% clay	1.3	5.2	23	4.0	7.1	.3
1214	None	.3	5.8	21	3.4	..	..
1215	14% $CaCO_3$	0	9.4	12	3.3	4.6	..
1209	4.2% TiO_2 8.4% $BaSO_4$	.6	5.0	25	2.2	..	..
1211	7.2% ZnS 5.8% $BaSO_4$	.7	6.0	26	4.7	..	..
Papers made from Soda and Sulphite (1:1) Pulps							
1133	None	0	6.4	34	5.6	6.8	.0
1134	8-10% clay	0	6.1	32	5.3	9.5	.3
1129	8-10% clay	0	4.8	32	5.1	9.5	.2
1143	None	.6	5.6	35	5.8	9.5	.6
1136	8-10% clay	.9	5.8	30	7.0	10.9	.4
1138	8-10% clay	1.6	4.9	30	6.2	10.4	.4
1173	21% $CaCO_3$	1.3	8.8	28	5.1	7.8	..
1144	7% TiO_2	.6	5.4	29	5.8	..	..
1153	6.2% ZnS 5.1% $BaSO_4$	.9	5.2	34	5.7	..	..
Papers made from Refined Sulphite Pulp							
1160	8-11% clay	0	6.6	16	1.3	2.7	.3
1164	8-11% clay	.9	5.6	21	2.4	5.2	..
1166	8-11% clay	.8	4.8	22	2.9	4.7	.3
Papers made from Highly Lignified Fibers (Newsprint)							
N-a	None	..	5.0	60	31.2	..	1.7
N-b	$NaHCO_3$ added	..	7.2	65	9.3	..	..

[a] Sheets maintained at 30° C. in air at 58% relative humidity.
[b] For other characteristics of the papers see reference *(8)*.
[c] Analytical resin values corrected for natural resins, fats, waxes, etc.
[d] pH of the cold-water extract of unirradiated sheets.
[e] To permit comparison with the results of other workers increases in copper numbers for representative papers during 40 hours of irradiation are included, as follows: No. 1136, 3.2; No. 1164, 1.6; No. 1182, 2.1; No. 1193, 1.2; No. 1203, 2.3. These changes are similar to those found by Richter *(1)*.
[f] 20-hr. irradiation on each side of sheet.
[g] Change in pH during 17-hr. period of irradiation.

It was found that papers having high absorption values, the newsprint and the soda-sulphite papers, deteriorated more than those having lower absorptions, the new rag, old rag, and refined sulphite papers. It is probable, however, that the fiber components were responsible for the differences in light stability, and that the absorption was only incidentally greater, although the two factors may have operated simultaneously. The condition of the fiber is obviously important, since the old rag papers were, in general, less stable than the new rag papers.

Other factors, such as content of lignin, rosin and acid, are more important than extent of absorption, in determining paper deterioration, as shown strikingly by the extreme example, *N*-b, which, although having a somewhat higher absorption than *N*-a, was much more stable than the latter because of the presence of $NaHCO_3$, which apparently increased the light stability of the lignin.

Substances other than cellulose influenced the light absorption by the sheet, with varying consequences. The rosin in 1179 almost doubled the light absorption but caused little or no increase in deterioration. Certain fillers changed the absorptions of the rag papers with but slight effects on light stability. The darkening of newsprint by addition of $NaHCO_3$ increased the absorption. These effects on light absorption arose from the presence of relatively large amounts of material. It was, therefore, of interest to change the absorption of paper by adding only minute amounts of absorbing materials. Accordingly, some experiments were conducted with papers dyed by dipping in 1% acetone solutions of various dyes. Aqueous solutions were avoided to preserve flatness in the sheets for adequate temperature control during irradiation.

The results in Table IV show that the dyeing doubled and trebled the light absorption but that the light stabilities of the papers were not lowered in every instance. The data indicate that certain dyes present in very small amounts, are capable of transferring the absorbed radiant energy to some types of fibers in such manner as to cause deterioration. The data also show that deterioration is not proportional to extent of absorption, other things being equal. It should be mentioned that the dyes were usually completely faded during the first half of the period of irradiation.

TABLE IV.—EFFECT OF VARIOUS DYES [a] UPON THE LIGHT [b] STABILITY OF PAPERS

Paper No. and dye	Decrease in alpha-cellulose percentage	Light absorption %
1160	1.3	16
1160 + eosin	4.9	32
1160 + aniline yellow	1.1	47
1160 + alizarin cyanine yellow	1.8	47
1160 + nigrosine	2.3	..
1160 + sudan II	2.5	41
1214	3.4	21
1214 + eosin	4.3	45
1214 + cyanine green	2.4	48
1203	4.0	23
1203 + eosin	3.0	47

[a] Dyed by dipping in 1% solutions of the dyes in acetone.
[b] 17 hours of irradiation under the usual conditions.

Similar sensitization appears to have been found by others working with textile materials *(15)*.

The absorption values given in Tables III and IV were calculated from reflectance and transmission values, inasmuch as the fraction of the incident light absorbed by the sheet corresponds to the light *not* lost by reflection and transmission.

The absolute, total reflectance and transmission of each sheet were measured by methods described in detail by one of the writers elsewhere *(14)*. The reflectance at 45° from normal incidence was used. Since the carbon arc used varied greatly in color and intensity from one instant to another, average values for one-half hour periods were obtained by substituting a Leeds and Northrup recording potentiometer, including a 100-ohm galvanometer, for the usual manually operated potentiometer. The light intensities necessary for the direct operation of this instrument by the photocells had to be higher than is compatible with greatest precision in the circuit used, but tests with rotating sectored disks, transmitting 25 and 50%, showed that transmissions could

be measured to an accuracy of ± 0.5% transmission with this arrangement.

The fractional absorption, A_p, of a sheet of paper, p, is defined in terms of its reflectance, R_p, and its transmission, T_p, as follows:

$$A_p = 1 - R_p - T_p \quad (1)$$

In the case of a sheet mounted on an aluminum backing, as in the usual experimental arangement, some of the radiant energy transmitted by the sheet is returned by reflection to the sheet. By summing up the infinite series of reflections undergone by this radiant energy between the sheet and the aluminum, it can be shown that the fraction of the total radiant energy available to the sheet by reflection from the backing of reflectance R_{Al} is $T_pR_{Al}/\ 1 - R_pR_{Al}$ of which quantity the sheet absorbs the fraction A_p.

Combining the fractions of the incident and reflected light absorbed, it is seen that the paper mounted on the aluminum backing absorbs the fraction A'_p of the total, incident light:

$$A'_p = A_p\left(1 + \frac{T_pR_{Al}}{1 - R_pR_{Al}}\right) \quad (2)$$

The value of R_{Al} was determined experimentally as follows: The reflectance of a paper mounted on the aluminum backing may be designated as R_{p+Al}, and can be shown by the method of summation of an infinite series to be

$$R_{p+Al} = R_p + \frac{T_p^2R_{Al}}{1 - R_pR_{Al}} \quad (3)$$

The quantities $R_{p\ +\ Al}$, R_p and T_p, for the light used in the usual experimental arrangement, were measured for three thin papers, and when substituted into Equation 3 gave a value of $R_{Al} = 0.73$[4] as an average of three closely agreeing results.

All of the values for light absorption listed in Tables III and IV were calculated using Equations 1 and 2. Since the optical values changed because of bleaching, or, in the case of newsprint, yellowing, measurements were made before and after irradiation and the average values used for calculation.

Oxygen and moisture in surrounding atmosphere. The light stability of paper was found to be very materially increased by a lack of oxygen in the surrounding atmosphere. The data showing this for widely differing papers are given in Table V. All chemical changes during irradiation were found to be smaller in purified nitrogen than in air.

All photochemical changes did no cease at the low concentration of oxygen, less than 0.03% by volume in the nitrogen used, as shown particularly by the changes in alpha-cellulose. The chemical changes indicated by fluidity data, however, occurred only slightly or not at all, except in newsprint, at this concentration of oxygen. In a special experiment (described in footnote 3) with a probably much lower concentration of oxygen, the changes in newsprint were found to be practically the same as those shown in TABLE V. This would indicate, but, of course, not prove conclusively, that slight photochemical changes in paper occur even in the complete absence of gaseous oxygen.

The light stability of papers irradiated in extremely dry air (containing less than 0.0007% of gaseous water by volume) showed a fundamental difference between papers derived from wood and those derived from cotton. As seen from Table V, lack of water vapor caused smaller changes in alpha-cellulose for the wood-pulp papers, but larger changes for the papers derived from cotton, than resulted from light under normal conditions of moisture. The fluidity data are again inconclusive for the rag papers, as in the case of the experiments in nitrogen. It is of interest to note that the acidity of all types of papers was increased by irradiation in dry air. Control experiments in the dark showed no changes.

Time and intensity of irradiation. The data of Tables III, VI, and VII show that the alpha-cellulose changes were proportional to less than the first power of the lengths of time of irradiation and light intensity, except, perhaps, in the early stages of irradiation. Exposure of relatively unchanged fibers, by turning the sheet over, increased the rate of deteriora-

TABLE VI.—EFFECT OF VARYING THE TIME OF IRRADIATION [a]

Paper No.	Hours of irradiation: 1 1/8	2 1/8	4 1/4	8 1/2	17	34	51
	Decrease in alpha-cellulose percentage						
N (newsprint)	5.3	9.9	16.1	25.4	35.9 [b]	..	..
1136 (soda-sulphite)	..	..	..	3.9	(42.8) [a] 7.0	10.4	12.5
1166 (refined sulphite)	..	.	..	1.6	2.9	3.8	4.7
1182 (new rag)	..	..	..	2.7	4.2	5.4	7.0
1203 (old rag)	..	..	..	2.2	4.0	..	8.2

[a] The usual conditions of irradiation prevailed for all papers with the exception of one experiment with newsprint, in which the sheet was irradiated for 8½ hours on each side. The corresponding value is given in parentheses.

[b] This value for newsprint and that in Tables VII and XI differ from that in Tables III, V, and VIII because of a change of arc lamp globes, necessitated by breakage. Except for this instance, globes were changed with sufficient frequence to avoid important differences arising from solarization of the glass.

[4] This value for the reflectance of the etched aluminum backing may be compared with 0.734, the average reflectance for the region of 400 to 740 mμ, obtained from a rather flat curve, using the General Electric recording spectrophotometer. This curve was obtained by H. J. Keegan of the Bureau. The data were then converted to absolute values of reflectance.

TABLE V.—THE EFFECT OF OXYGEN AND MOISTURE UPON THE LIGHT [a] STABILITY OF PAPERS

Paper No.	Decrease in alpha-cellulose percentage: Air [b]	Nitrogen [c]	Dry air [d]	Increase in cuprammonium fluidity: Air [b]	Nitrogen [c]	Dry air [d]	Lowering of pH: Air [b]	Nitrogen [c]	Dry air [d]
Wood Pulp Papers									
1133 (soda-sulphite)	5.6	1.4	2.7	2.9	0.0	1.2	..	..	..
1136 (soda-sulphite)	7.0	2.6	4.8	4.0	.1	1.2	.4	.2	.55
1138 (soda-sulphite)	6.2	2.6	6.2	2.8	.3	1.4	.45	.4	.55
1166 (refined sulphite)	2.9	..	2.5	..	..	..	..	..	..
N (newsprint)	31.3	6.5	20.0	9.7	5.1	..	1.7	.75	1.6
Rag Papers									
1182 (new rag)	4.2	1.2	5.2	1.3	.0	.9	.3	.0	.45
1186 (new rag)	3.0	1.4	5.3	1.7	.3	1.7	.1	.0	.35
1191 (old rag)	3.2	.3	..	1.0	.0	..	.4	.05	..
1200 (old rag)	3.5	.9	5.2	1.4	.0	1.0	.85	.0	1.15
1203 (old rag)	4.0	1.0	6.8	1.4	.1	1.3	.3	.25	.8

[a] 17 hours of irradiation, under the usual conditions, except as indicated.
[b] 58 per cent relative humidity at 30° C.
[c] Contained less than 0.03% O_2 after purification. See reference *(5)* for all details.
[d] Not greater than 0.015% relative humidity at 30° C.

TABLE VII.—EFFECT OF VARYING THE LIGHT INTENSITY

Paper No.	Relative light—intensity [a] 1.0[b]	½	¼	⅛	1/16	1/32
	Decrease in alpha-cellulose percentage					
N (newsprint)	35.9	29.6	23.6	15.8	8.8	4.7
1136 (soda-sulphite) ...	12.5	10.8	...	...	...	...
1203 (old rag)	8.2	6.7	...	...	...	...

[a] Other conditions of irradiation were as usual. The newsprint paper was irradiated for 17 hours and the other two papers were irradiated for 51 hours, at each intensity.

[b] Unity represents an absolute incident intensity of 0.17 watts/cm². Variation in intensity was secured by increasing the distance between the arc and the sheet according to the inverse-square law, taking the average intensity over the sheet into account.

tion, as shown by the experiment with newsprint, *N*, Table VI.

The departure from proportionality of alpha-cellulose change with respect to time and intensity is seen to be rather small within the first 17-hour period for the various types of papers, with the exception of newsprint. Even in the latter case the departures do not affect the conclusions based upon the various data for newsprint.

Lignin. The extensive deterioration by light of newsprint paper probably arises from the photochemical reactivity of lignin. Along with the large change in alpha-cellulose in this paper, *N*-a of Table III, the lignin content decreased from 19.1 to 13.7% during irradiation.[5] The other papers contained little or no lignin; paper 1133, for example, was found to have a lignin content of less than 0.5%.

TABLE VIII.—EFFECT OF GASEOUS OXYGEN UPON THE LIGHT [a] STABILITY OF NEWSPRINT

Composition of atmosphere [b]	Decrease in alphacellulose percentage	Increase [e] in copper number	Lowering of pH
Air (21% O_2)	31.3	15.7	1.7
N_2[c] + 1.1% O_2[d]	17.1	...	1.3
N_2 + 0.21% O_2	13.7	...	1.1
N_2 + 0.11% O_2	12.2	4.6	1.0
N_2 + 0.03% O_2	6.5	2.2	.75

[a] 17 hours of irradiation under the usual conditions excepting oxygen content.

[b] All experiments were conducted at barometric pressure.

[c] Contained argon and any other inert gases usually present in commercial "water pump" nitrogen, after purification to remove oxygen.

[d] The various oxygen pressures were obtained by evacuating the system to the desired air pressure and refilling with purified N_2, except in the experiment with the lowest concentration of O_2, which was obtained as described in reference *(5)*.

[e] Copper number for the unirradiated control was 5.4.

The chemical changes in newsprint irradiated at various concentrations of oxygen are shown in Table VIII. The sheets yellowed according to the oxygen content; only slight yellowing occurred at the lowest oxygen content listed, and none at all in the special experiment described in footnote 3.

The light stability of newsprint is very materially increased by buffering the sheet at pH = 7.2, as shown by the data for paper *N*-b, Table III. In this experiment the sheet was dipped in a solution of $NaHCO_3$, and after air-drying was found to have retained 0.12 gram of $NaHCO_3$, which gave the sheet a pH of 7.2. During subsequent irradiation the lignin content decreased only 2.1%, indicating a relationship between lignin change and cellulose deterioration.

Whatever the steps between the initial absorption of radiant energy by lignin and the change in the cellulose may be, the rate of one or more of these reactions was greatly dependent upon the acidity of the paper. Relatively large quantities of acidic substances were produced during the irradiation, as shown by the change in pH from 5.0 to 3.3 for paper *N*-a. The first cold-water extract of 1 gram of sample *N*-a, after and before irradiation, was found to require 10 ml. and 1 ml., respectively, of 0.01 *N* NaOH for titration to an endpoint of pH = 7.5 using the glass electrode, in the absence of CO_2. The titration curve thus obtained was characteristic of an acid much weaker than acetic, in that the voltage changes were very gradual. The pH, 3.3, at the beginning of the titration, however, corresponded to an acid stronger than acetic. These two facts together indicate that a series of acids of various degrees of ionization were formed during the irradiation. The amount of materal extractable with hot water increased from 1.0 to 9.6% during the irradiation.

It does not seem likely, however, that the hydrogen ions which these acidic reaction products yielded were responsible for the large effect of light upon newsprint paper, inasmuch as the data of Table IX show that sulphuric acid at a pH of 3.3 had only a small effect upon the light stability of this paper.

The resinous material in newsprint apparently did not affect the light stability appreciably. It was found that a sheet which had been extracted with ethyl alcohol, benzene and ether before irradiation showed no improvement in light stability.

The effect of moisture upon the light deterioration of highly lignified papers is seen from Table V to be moderate from the fact that extreme desiccation had only a minor effect. At an intermediate value of relative humidity, 35% at 30° C., the decrease in alpha-cellulose percentage was found to be 27.9 instead of 31.3. The increase in copper number corresponding to the 17-hour period of irradiation in very dry air was 11.4.

Acidity. The results given in Table III show that the sulphuric acid, present in papers because of the hydrolysis of aluminum sulphate used in their manufacture, had varying effects upon light stability, depending greatly, however, upon the type of fiber. This is in contrast to the thermal stability of papers, for which the pH, irrespective of fiber content, is a most important index of stability 8a.

The decrease by acid of the light stability of papers made from new rags can be seen from the pairs 1177, 1178; 1179, 1182; 1183, 1186. On the other hand, the light stability of papers made from old rags or wood pulps was much less affected by acid, as seen from the pairs 1191, 1193; 1200, 1203; 1133, 1134; 1129, 1173; 1164, 1166. The greatly increased stability of newsprint after the addition of $NaHCO_3$ to the sheet was apparently due to an increase in the light stability of lignin in the neutral medium rather than an increase in the light stability of cellulose.

TABLE IX.—EFFECT OF SULPHURIC ACID [a] UPON THE LIGHT STABILITY OF PAPERS

Paper No.	Before addition of acid: pH	Before addition of acid: Decrease [b] in alpha-cellulose percentage	After addition of acid: pH	After addition of acid: Decrease [b] in alpha cellulose percentage
	Wood pulp papers			
1133 (soda-sulphite)	6.4	5.6	3.6	6.9
N (newsprint)	5.0	9.9 [b]	3.3	12.2
1160 (refined sulphite)...	6.6	1.3	3.7	3.3
	Rag paper			
991 (new rag).....	6.9	0.8	3.6	5.3

[a] Acid was added to the sheets by dipping them in solutions of sulphuric acid in absolute alcohol of the concentrations necessary to give a pH near 3.6 of the treated sheet, as determined by trial.

[b] Change during irradiation under the usual conditions for 17 hours, with the exception of the newsprint, which was irradiated for 2½ hours to secure a comparable decrease in alpha-cellulose.

[5] Similar changes in lignin contents of certain types of wood during irradiation with sunlight have been observed by Richter *(1)*.

Experiments with papers containing unusually large amounts of acid gave similar results. Sheets were dipped in solutions of sulphuric acid in absolute alcohol of concentrations necessary to give a pH near 3.6 in the treated sheets, and dried before irradiation. The results given in Table IX show that acid has a much larger effect upon the light stability of the paper made from new rags, 991, than upon the others. Control sheets containing like amounts of acid showed no alpha-cellulose changes when kept in the dark for the same period used for irradiation.

Content of rosin and other sizing materials. Rosin, in the amount and manner in which it is usually introduced into paper by flocculation with aluminum sulphate, was found to be an unimportant factor in the deterioration of paper by light unless the acidity is injuriously high. The effect of the latter condition is exemplified by the pair 1182, 1186, Table III. The effect, furthermore, was most pronounced for new rag papers, since the soda-sulphite paper 1138, containing much rosin, was only slightly less stable than 1129, containing no rosin. At low acidities, even for new rag papers, relatively large amounts of rosin had little or no effect, as shown by paper 1179. Paper 1173, in spite of the rosin, was one of the more stable papers of its group.

TABLE X.—EFFECT OF ROSIN [a] AND "HYDROGENATED ROSIN" [b] UPON THE LIGHT STABILITY OF PAPERS

Paper No.	Rosin %	Decrease in alpha-cellulose percentage [c]	Lowering of pH [d,e]
1134 (soda-sulphite)	0	5.3	...
1134 (soda-sulphite)	3.9	7.7	...
1134 (soda-sulphite)	5.9	7.5	...
1160 (refined sulphite)	0	1.3	0.3
1160 (refined sulphite)	2.3	5.7	.95
1160 (refined sulphite)	4.9	6.9	1.20
1160 (refined sulphite)	10.6	7.3	1.45
991 (new rag)	0	0.8	...
991 (new rag)	1.4	3.9	...
991 (new rag)	3.2	4.0	...
991 (new rag)	5.6	4.7	...
	Hydrogenated rosin %		
1160 (refined sulphite)	2.2	6.0	1.25
1160 (refined sulphite)	4.8	7.2	1.45
1160 (refined sulphite)	9.7	8.5	1.60

[a] Papermakers' rosin grade "F" applied to sheets from solutions in absolute alcohol.
[b] Known as "Staybelite" *(16)* and applied to sheets from solutions in absolute alcohol.
[c] Both types of rosin were removed from sheets before alpha-cellulose determination by extraction with absolute alcohol in Soxhlet apparatus. Control tests showed no change in the paper during extraction, and qualitative rosin test showed practically complete extraction.
[d] pH measurements made with rosins present in the sheets.
[e] Before irradiation, the papers containing rosin had a pH near 5.3; those containing "hydrogenated rosin" had a pH near 5.6.

Rosin, when added to sheets of paper by brushing with solutions of rosin in absolute alcohol, increased the deteriorating effect of light as much as or, in some instances, even more than sulphuric acid. This is shown by the results listed in Table X for sheets thus treated with rosin before irradiation. The original light stabilities of papers made from new cotton fibers or refined wood fibers were greatly lessened by rosin thus added, whereas the stability of the ordinary wood fibers was not greatly affected.

The pH of papers containing rosin introduced in this manner was found to be near 5.4 before irradiation. The acidity of the rosin was, therefore, not great enough to account for the deteriorative effect of light, inasmuch as the much higher acidities of sulphuric acid in the papers listed in Table IX had, in general, smaller effects.

It appeared possible that the effect of rosin might be ascribed to the presence of double bonds in the rosin acid molecules. The experiments were, therefore, repeated with a rosin the double bonds of which had presumably been eliminated by hydrogenation *(16)*.

The results with hydrogenated rosin are also given in Table X and show that this material decreased the light stability of papers somewhat more, if anything, than the unsaturated rosin. The pH changes during irradiation for both types of rosin were also quite similar and resembled those of lignin in magnitude.

It appears, therefore, that properties other than the presence of double bonds or the behavior as an acid were responsible for the deteriorative effect of rosin. The remaining apparent reason, that of increased light absorption, was considered. The light absorption was measured for the sheets of paper No. 1160 containing 0, 2.3, 4.9, and 10.6% rosin, and were found to be 16, 19, 20, and 24%, respectively, which values obviously do not represent sufficient increases in absorption to explain the greater deterioration, not even when the 5 to 6% increase in absorption, due to darkening caused by irradiation of these large quantities of rosin, is taken into account.

The effect of glue upon the light stability of paper appears to be small, if it existed at all, since the slight increases in deterioration of papers 991 and 1013, Table III, could easily be accounted for by the increased acidity caused by the acid in the glue sizing solution. No effect of starch was found.

The sizing materials themselves were physically and chemically affected by light. The water resistance of sized papers was found to decrease during irradiation, as was also found by Zhereboff *(17)* and Richter *(1)* for sunlight. A rosin, a glue and a starch-sized paper were each found to have lost over one half of their sizing values (in terms of time of penetration of water using the dry indicator method) during the 17-hour period of irradiation.

During irradiation the rosin in the papers of Table III became almost completely insoluble in anhydrous ether, although its solubility in ethyl alcohol apparently remained unchanged. Its acidimetric equivalent weight, as determined by titration with alcoholic KOH decreased from 340 to 213 grams per equivalent, which, together with the lowering of the pH shown in Table X, shows that the rosin acid molecules are decomposed into molecules having carboxyl groups. The rosin was also found to undergo oxidation as shown by the fact that its oxidimetric equivalent weight *(9c)* decreased from 3.63 to 3.13 grams per equivalent.

Analyses for glue and starch before and after irradiation showed decreases of 5 to 10% of the amount of sizing material originally present.

Protection by printers' ink. The data in Table XI show that paper is extensively protected by ink against

TABLE XI.—EFFECT OF PRINTERS' INK,[a] SOLID BLACK, IN PROTECTING PAPERS AGAINST LIGHT [b]

Paper No.	Decrease in alpha-cellulose percentage [c]	
	Plain	Printed solid black
N	35.9	8.1 (32.5)[d]
1129	5.1	1.4
1134	5.3	1.5
1136	7.0	0.0
1191	3.2	1.1
1216	2.5	1.8

[a] The papers were printed at the Government Printing Office, using the regular "job black" ink, through the kind cooperation of Robert H. Simmons.
[b] 17 hours of irradiation under the usual conditions.
[c] The alpha-cellulose percentage of a printed paper is appreciably lower than that of the plain paper owing to the presence of certain alkali-soluble materials in the ink. To obtain the decrease brought about by light, therefore, the unirradiated solid black paper was analyzed for control purposes.
[d] The value in parentheses corresponds to a paper printed in the normal way with letters. Therefore, only a small part was protected by ink.

the action of light. The papers were printed at the Government Printing Office using the regular "job black" ink. The sheets were printed on one side only, either solid black or with lower-case, 5-point face Roman type. Experiments with the latter, however, were conducted only with newsprint, inasmuch as the protection afforded by letters extends normally to but 10 to 15% of the area of the sheet and was, therefore, difficult to measure accurately except for unstable papers.

The behavior of ink, which is principally on the surface of a sheet, is thus seen to be quite different from the behavior of a sensitizing dye. Although the ink absorbed almost all of the incident light, little or no transfer of photochemically active energy to the fibers occurred.

Thermal Stability of Papers

The increase in acidity occurring in paper during exposure to light, as shown by the fall in pH, Table III, suggests that a paper, once exposed to light, will no longer be as stable, even if stored in the dark, as the same paper had it not been so exposed. This was found to be the case.

TABLE XII.—EFFECT OF LIGHT [a] UPON SUBSEQUENT STABILITY OF PAPERS

Paper No.	Decrease in alpha-cellulose percentage during heating [b]: Paper not previously irradiated	Paper previously irradiated [c]
1129	14.9	29.7
1138	5.2	13.6
1143	5.8	9.5
1166	2.8	6.1
1191	3.1	5.5
1133	0.0	2.4
1182	4.0	5.0
1200	2.0	2.3
1203	5.4	4.4

[a] 40 hours of irradiation (20 hours on each side of sheet) under the usual conditions.
[b] Heating for 72 hours at 100° C. in the dark in air.
[c] These values are the result of subtracting the values for alpha-cellulose change due to light from those due to light plus heat.

A variety of papers were first irradiated and then one half of each sheet heated in an "accelerated aging" oven in the dark in air at 100° C. for 72 hours, along with sheets of the same papers not previously irradiated. The irradiated paper, the irradiated and heated papers, and the heated papers were then analyzed. The alpha-cellulose changes in the third series correspond to the thermal or ordinary stability of the papers, and are listed in column 2 of Table XII. The values for alpha-cellulose decrease in the irradiated and heated papers, diminished by the values for alpha-cellulose decrease during irradiation alone, yielded the values corresponding to the thermal or ordinary stability of papers exposed to light at some time and then stored in the dark. These results are listed in column 3 of Table XII, and show that most papers once irradiated may be expected to be considerably less permanent than if they had not been exposed to light.

Literature Cited

1. George A. Richter, "Relative Permanence of Papers Exposed to Sunlight," *Ind. Eng. Chem.* 27: 177, 432 (1935).
2. S. R. H. Edge and Helen M. McKenzie, "Discolouration of Wood Pulp by Light and Heat, *Paper Makers' Assoc. Gr. Brit. Ireland, Tech. Sect. Proc.* 17: 437 (March 1937).
3. Sutezo Oguri, *J. Soc. Chem. Ind. Japan* 37: 201, 620 (1934); 39: 35, 286 (1936); 40: 300, 356 (1937); 41: 3 (1938).
4. H. Bakker, (Yellowing of newsprint by sunlight), *Chem. Weekblad* 34: 543 (1937).
5. Herbert F. Launer, "Apparatus for the Study of the Photo-Chemistry of Sheet Materials," *J. Research NBS* 24: 567 (1940). *R. P.* 1300.
6. Sigurd Köhler, "Protection of paper against sunlight by colored glass windows," *Teknisk Tidskrift* 7: 49 (1935).
7. W. W. Coblentz, M. J. Dorcas, and C. W. Hughes, "Radiometric Measurements of the Carbon Arc and Other Light Sources Used in Phototherapy, *B. S. Sci. Papers* (No. 539) 21: 549 (1926).
8. (a) Merle B. Shaw, and Martin J. O'Leary, *J. Research NBS* 21: 671 (1938), *R. P.* 1149; (b) Merle B. Shaw, George W. Bicking and Martin J. O'Leary, *J. Research NBS* 14: 649 (1935), *R. P.* 794.
9. Herbert F. Launer. (a) alpha-cellulose: *J. Research NBS* 18: 333 (1937), *R. P.* 979; 20: 87 (1938), *R. P.* 1068. (b) pH: *J. Research NBS* 22: 553 (1939), *R. P.* 1205. (c) resin: *J. Research NBS* 18: 227 (1937), *R. P.* 973. These three methods are available as TAPPI Standards T 429 m, T 435 m and T 408 m, respectively.
10. Ralph T. Mease, "Measurement of the Apparent Fluidity of Dispersions of Cellulose in Cuprammonium Solution, *J. Research NBS* 22: 271 (1939), *R. P.* 1179.
11. See corresponding TAPPI methods. Technical Assoc. Pulp and Paper Industry, 122 East 42nd Street, New York City.
12. Geo. J. Ritter and James H. Barbour, "Effect of Pretreatment of Wood on the Lignin Determination, *Ind. Eng. Chem. Anal. Ed.* 7: 238 (1935).
13. Herbert F. Launer, "An Easily Constructed, Rugged, Sensitive Thermopile," *Rev. Sci. Instr.* 11: 98 (1940).
14. Herbert F. Launer, "Reflection-Transmission Relationships in Sheet Materials," *J. Research NBS* 27: 429 (1941). *R. P.* 1430; *J. Opt. Soc. Am.* 32: 84 (1942).
15. F. Scholefield and H. A. Turner, *J. Textile Inst.* 24: 130P (1933).
16. A. C. Dreshfield and J. H. Long, "Stabelite, a Hydrogenated Rosin for Size, *Paper Trade J.* 113: 40 (July 17, 1941).
17. L. P. Zhereboff, "Effect of Sunlight on Vegetable Paper Sizes," *Paper Trade J.* 76: 112 (March 15, 1923).

Canadian Lumbermen Meet

At the annual three-day convention of the Canadian Lumbermen's Association, held in Montreal, over 500 delegates attended. E. W. Ross, lumber sales manager of the Fraser Companies, Limited, was elected president for the ensuing year, succeeding J. G. Fleck. W. J. LeClair was re-elected secretary-manager.

A feature of the convention was an address by A. H. Williamson, timber controller for Canada, who spoke of plans for encouraging production of lumber and discouraging its non-essential use. Dealing with the policy regarding exports to the United States, Mr. Williamson said that it was intended to operate within the spirit of the Hyde Park agreement which basically, he noted, provided on broad lines equal access to raw materials in each country for purposes of equal urgency.

He stressed the fact that contrary to some press reports, "our relationship with the lumber division and the pulp and paper division of the War Production Board, have been harmonious and on both sides of the border we have worked hard and co-operated fully so that our joint efforts will make the greatest contribution to the joint war effort."

Kimberly Makes Best Safety Record

The best safety record in the history of the various mills of the Kimberly-Clark Corporation has been made by the employees of the mill laboratory and testing stations at Kimberly, Wis. On February 7, this department completed 25 years of operations without a lost-time accident. A celebration was held at the mill clubhouse, climaxed by a chicken dinner. Dudley Courchane and Glen Striby, safety and technical directors, respectively, of the mill, gave talks congratulating the employees on their records. John Fanslow of the Neenah, Wis., office pointed to the importance of this record to the entire organization. A committee will be appointed to write up the record and send it to the National Safety Council.

The last worker to suffer a lost-time accident in the department was Cornelius Riggles, Neenah, Wis., and the date was February 7, 1918. He was presented with a leather medal which he will frame with the record of his accident. It will be placed in the mill, and the medal will remain there until presented to the next accident victim. George Gerritts, now in charge of the department, expressed gratitude to his employees.

Now Wyandotte Chemicals Corp.

The Michigan Alkali Company, and its affiliate, the J. B. Ford Company, have consolidated as one company to be known as Wyandotte Chemicals Corporation. The consolidation, which combines in one organization one of the largest producers and distributors of chemicals and the world's largest manufacturer of specialized cleaning materials, was effective January 1.

E. M. Ford, formerly vice-president and treasurer of Michigan Alkali Company, is president of the new corporation. In his announcement he said the consolidation will entail no change in ownership nor will any new personnel be included in management. It is being effected, he said, solely in the interest of more efficient operation and distribution. E. M. Ford occupies the position which was to have been assumed by his father, E. L. Ford, grandson of Captain John B. Ford, founder of the business. E. L. Ford died suddenly on December 20.

F. S. Ford and W. F. Torrey are vice presidents of the new corporation; Ford Ballantyne is secretary and treasurer. Other officers are: S. T. Orr, vice president in charge of manufacturing; I. H. Taylor, vice president in charge of sales; G. W. Schwarz, controller; C. B. Robinson, vice president in charge of sales J. B. Ford Division; and Bert Cremers, vice president in charge of sales Michigan Alkali Division.

The sales departments of both companies will temporarily maintain their separate identities as divisions of Wyandotte Chemicals Corporation, whose production is largely devoted to war effort and essential civilian needs. In addition, the Michigan Alkali Division will be responsible for sales in the glass, soap, paper, chemicals (carload lots), flour mill, rayon, oil refinery, synthetic rubber, steel, aluminum, coal mine, and public highway industries.

In addition to war production, the J. B. Ford Division will cover dairies, laundries, bottlers, metal cleaners, hospitals, institutions, brewers, railroads, and other industries not specifically assigned to Michigan Alkali Division and will continue to promote the sale of Wyandotte cleanser for home use. Both divisions will call on textile and railroad customers.

I. H. Taylor
Vice President in Charge of Sales Wyandotte Chemicals Corporation

Bert Cremers
Vice President in Charge of Sales Michigan Alkali Division Wyandotte Chemicals Corporation

The Michigan Alkali Company, which is one of the largest producers of soda ash, caustic soda, chlorine, dry ice, calcium carbonate, bicarbonate of soda, and other chemicals used in virtually all industries, was established 52 years ago.

The J. B. Ford Company was created in 1898. It has developed into the world's largest manufacturer of specialized cleaning materials, and an important factor in promoting sanitation and safeguarding the health of America.

Newsprint Production Decreases

Production of newsprint in Canada during January 1943 amounted to 233,544 tons and shipments to 215,016 tons, according to the News Print Service Bureau. Production in the United States was 69,792 tons and shipments 69,691 tons, making a total United States and Canadian newsprint production of 303,336 tons and shipments of 284,707 tons. During January, 13,625 tons of news print were made in Newfoundland, so that the North American production for the month amounted to 316,961 tons. Total production in January 1942 was 425,154 tons. There was one more working day in January 1942 than in January 1943.

The Canadian mills produced 78,360 tons less in January 1943 than in January 1942, which was a decrease of twenty-five and one-tenth percent. The output in the United States was 14,836 tons or seventeen and five-tenths percent less than in January 1942, in Newfoundland production was 14,997 tons or fifty-two and four-tenths percent less, making a total decrease of 108,193 tons, or twenty-five and four-tenths percent less than in January 1942.

Stocks of newsprint paper at the end of January were 110,514 tons at Canadian mills and 9,702 tons at United States mills, making a combined total of 120,216 tons compared with 101,587 tons on December 31, 1942, and 154,904 tons at the end of January 1942. During the winter some tonnage is accumulating at points from which water shipments will later be made.

New York Paper and Pulp Market Review

Demand for Paper is Active—Inquiries For Wood Pulp are Heavy With the Supply Situation Indicating a Tighter Market in the Future—Buying of Roofing Rags Goods—No. 1 Mixed Paper Higher.

Office of the PAPER TRADE JOURNAL.
Wednesday, February 24, 1943.

Demand for major grades of paper continues active, according to reports received from many manufacturers' representatives, jobbers, and general paper merchants this week. Manpower and delivery difficulties are still reported increasing.

The index of general business activity for the week ended February 13 declined to 135.9, from 136.4 for the previous week, compared with 134.9 for the corresponding week last year. The index of paper board production was 136.0, compared with 138.7 for the previous week, and with 165.3 for the corresponding week for 1942.

Paper production for the week ended February 13 was estimated at 88.6%, compared with 103.4% for 1942, with 88.9% for 1941, with 86.6% for 1940, and with 82.6% for the coresponding week for 1939.

Paper board production for the week ended February 13 was 87.0%, compared with 101.0% for 1942, with 81.0% for 1941, with 70.0% for 1940, and with 67.0% for the corresponding week for 1939.

The index of manufacturers' inventories for December, 1942, which is the latest report issued by the Department of Commerce, stood at 177.6 for all industries, compared with December, 1941; all nondurable goods, 149.6, compared with 137.4 for December, 1941. The index of paper and allied products was 144.5 in December, 1942, compared with 135.1 for December, 1941.

The index of manufacturers' shipments for all industries was 242 on December, 1942, compared with 183 for December, 1941. The like index for paper and paper products was 144 in December, 1942, compared with 175 for December, 1941.

Pulpwood

The U. S. intends to import 1,550,000 cords of pulpwood from Canada in 1943, states a joint WPB and Canadian Timber Controller announcement of last week. The wood will come from the territory east of the Cascade Mountains. It has been agreed that export of pulp logs from British Columbia will be arranged sufficient to maintain operations in both the U. S. and in Canada at the same capacities and to maintain inventories in both countries at the same number of days' supply.

Wood Pulp

Inquiries for chemical wood pulp are heavy, but supplies are limited and the market is not very active so far as shipments are concerned. A WPB announcement states that Canadian mills expect to ship 1,170,000 tons of wood pulp to the U. S. in 1943.

Rags

Mill buying of new cotton cuttings is reported moderate at this date. This market continues to expect an OPA maximum price schedule on new rags soon and that higher than current prices will result.

Old cotton rags are firm, with mill demand for the roofing grades reported under current supply.

Washington reports that James T. Flannery, of Jersey City, N. J., is now in charge of old rags, cotton cuttings and waste paper for the OPA with the title of Chief of the Rag and Waste Paper Unit of the Office of Price Administration.

Old Rope and Bagging

Mill buying of old Manila rope is steady, with no important change reported this week.

Scrap bagging prices are firmer at this date. Reports from some quarters indicate the long expectation of an improved consumer demand is now beginning.

Old Waste Paper

Mill buying of No. 1 mixed paper, which has been improving in the last two weeks, has resulted in an advance in price to .55 per cwt. Prices on folded news and on other bulky grades are reported unchanged at this date.

Twine

Trade requirements in twine continue moderate to good in a few major grades. Government requirements are heavy. Prices are firm in all standard grades of hard and soft fiber twines.

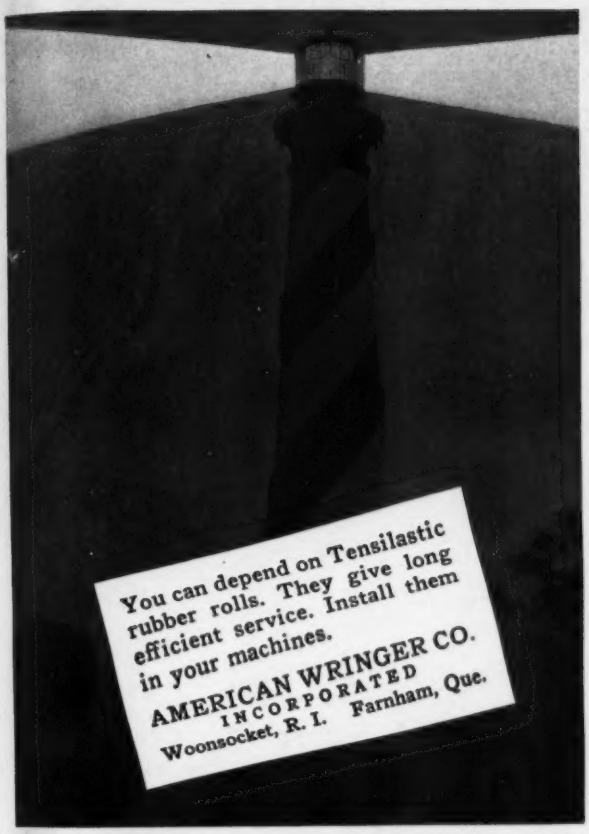
Bagley & Sewall Get Tax Reduction

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., February 24, 1943—An order has been signed by court authorities reducing the assessments on several parcels of property owned by the Bagley & Sewall Company as the result of certiorari proceedings. The reductions amount to about $40,000. The total amount of the original assessment was $540,000. Of this $220,000 was on water rights and appurtenances which was cut to $200,000; property on Pearl street cut to $190,000 from $200,000; property at Pearl and Moulton streets reduced from $30,000 to $28,000 and the foundry and storeroom on Sewall's Island reduced from $90,000 to $82,000. The company was represented in the proceedings by the firm of Costello, Cooney & Fearen, and the case was brought against the city assessors and officials.

Requests Active Duty

"Joe" Price, aged 72, former chief inspector of Greene, Tweed & Co., now pensioned under the company's retirement plan, recently visited the factory to volunteer his services "at the job I know best," in helping to turn out war contracts. He had a hand in training many of the present foremen who held an impromptu reception for him during lunch. When taken on a tour of the plant, Mr. Price was pleasantly surprised over the many improvements that have been made since his retirement. Mr. Price is a resident of Richmond Hill, N. Y.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MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL.
Wednesday, February 24, 1943.

BLANC FIXE—Quotations on blanc fixe are firm and continue unchanged at prevailing market levels. The pulp is currently quoted at $40 per ton in barrels, at works; the powder is offered at $60 per ton, f.o.b. works. Demand reported fair for the week.

BLEACHING POWDER—Prices on bleaching powder are firm. Current demand reported active. Bleaching powder is currently quoted at $2.50 per 100 pounds, in drums, at works. February allocation 87%.

CASEIN—Quotations on casein are unchanged for the week. Standard domestic casein, 20-30 mesh, is quoted at 19 cents per pound; 80-100 mesh at 19½ cents per pound; all prices in bags, car lots. Argentine casein, 20-30 mesh, is currently quoted at 9 cents per pound, c.i.f. No quotations on French casein.

CAUSTIC SODA—Prices on caustic soda are reported unchanged. Demand for the current week is reported very good. Solid caustic soda is currently quoted at $2.30 per 100 pounds, flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay are firm and continue unchanged. Demand reported fair for the current week. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton at mine. Imported clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Quotations on chlorine unchanged. Government demand for war use continues heavy. Prices firm. Chlorine is currently quoted at from $1.75 per 100 pounds, in single-unit tank cars, f.o.b. works. Allocation 83%.

ROSIN — Quotations on some grades of rosins are lower for the current week. "G" gum rosin is currently quoted at $3.37 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $3.32 per 100 pounds, in barrels, New York. Seventy per cent gum rosin size is quoted at $3.60 per 100 pounds, f.o.b. works.

SALT CAKE—Prices on salt cake are firm. Demand reported moderate for the current week. Domestic salt cake is currently quoted at $15 per ton in bulk; chrome salt cake at $16 per ton. All prices in car lots, f.o.b., shipping point. Quotations on imported salt cake are nominal at $16 per ton.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market quotations. Demand good. Quotations on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH — Prices on corn starch continue unchanged for the current week. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds; all prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Demand reported fair. The commercial grades are currently quoted at $1.15 per 100 pounds; iron free at from $1.75 to $1.85 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Prices on sulphur are firm and continue to conform to prevailing market quotations. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $18 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $16 to $21 per ton, at mills. No quotations on imported talc.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill			
Superstandard Wrapping	$5.00	@	—
No. 1 Wrapping	4.75	"	—
Standard Wrapping	4.50	"	—
Standard Bag	4.125	"	—
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.05	"	—
White No. 1½	1.00	"	—
White No. 2	1.00	"	—
Anti-Tarnish M. G.	.95	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.35	"	—
Bleached, Jr.	2.65	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	5.50	"	5.75
No. 2 Manila Wrapping, 35 lb.	5.25	"	5.50
Boards, per ton—			
News	*48.00	@	—
Chip	*45.00	"	—
Sgl. Mla. Ll. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*60.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	32.20 " 37.75	33.35 " 39.25
85% Rag	.... "	29.90 " 35.00
75% Rag	23.00 " 27.00	24.15 " 28.25
65% Rag	.... "	22.80 " 27.75
50% Rag	18.70 " 22.75	19.90 " 24.25
25% Rag	16.40 " 20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$10.55@$12.75	$11.70@$14.25
No. 2	9.65 " 11.75	10.80 " 13.25
No. 3	9.20 " 11.25	10.35 " 12.50
No. 4	8.90 " 10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$13.65@$15.50
No. 2 Glossy Coated	12.40 " 14.00
No. 3 Glossy Coated	11.60 " 13.25
No. 4 Glossy Coated	11.15 " 12.75
No. 1 Antique (watermarked)	10.25 " 11.75
No. 2 Offset	9.60 " 11.00
A Grade E. F.	9.35 " 10.75
A Grade S. & S. C.	9.60 " 11.00
B Grade E. F.	8.85 " 10.25
B Grade S. & S. C.	9.10 " 10.50
C Grade E. F.	8.55 " 9.75
C Grade S. & S. C.	8.80 " 10.00
D Grade E. F.	8.25 " 9.50
D Grade S. & S. C.	8.50 " 9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight to Destination.

Bl. Softwood Sulphite	$76.00
Unbl. Softwood Sulphite	65.00@ 66.00
Bl. Hardwood Sulphite	73.50
Unbl. Hardwood Sulphite	63.50
Bl. Mitscherlich	81.00
Unbl. Mitscherlich	72.00
N. Bleached Sulphate	86.00
S. Bleached Sulphate	79.00
N. Semi-Bleached Sulphate	62.00
S. Semi-Bleached Sulphate	75.00
N. Unbl. Sulphate	73.00
S. Unbl. Sulphate	63.50
Bl. Soda	66.00
Unbl. Soda	62.00
Groundwood	46.00

Transportation Allowances

Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	$11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

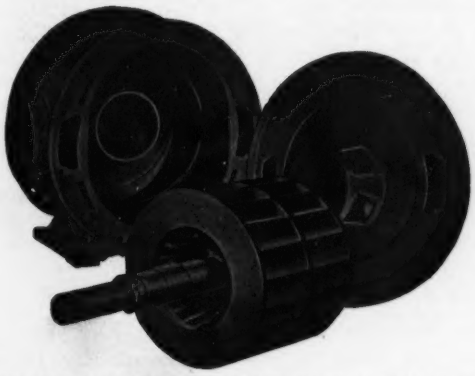
Domestc Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1.	6.50	@	6.75
Silesias No. 1	4.50	"	4.75
New Unbleached	6.50	"	6.75
Blue Overall	5.00	"	5.25
Fancy	3.50	"	3.75
Washables	2.75	"	3.00
Mixed Khaki Cuttings	2.75	"	3.00
O. D. Khaki Cuttings	3.25	"	3.50

SIMPLICITY



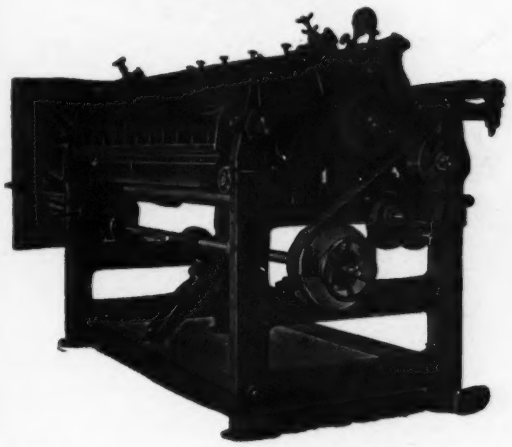
NASH VACUUM PUMPS HAVE ONE MOVING PART

Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

MODEL 28

ROLLER BEARING CUTTER



HAMBLET MACHINE CO.

LAWRENCE, MASS.

MAKERS OF
SINGLE, DUPLEX AND DIAGONAL PAPER CUTTERS
CUTTER KNIVES, PATENT TOP SLITTERS.

Since 1901

Dietz Machine Works

DIETZWORKS PHILA PA

MANUFACTURERS

TOILET ROLL CONVERTING MACHINES
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ROTARY CARD CUTTERS
SLITTERS FOR VULCANIZED FIBRE

Sta. "O" 126-128 W. Fontaine St. Phila., Penna.

Mill Cogs

ON SHORTEST POSSIBLE NOTICE

We make all kinds of Mill Cogs and have special facilities that will be of great service to you. We make a specialty of "ready dressed" cogs which are

READY TO RUN

the moment driven and keyed. Write at once for circular "G" and instruction sheets free.

THE N. P. BOWSHER CO.
South Bend, Ind.
Established 1882

CLINTON

- QUALITY
- UNIFORMITY
- SERVICE

STARCHES

SPECIAL GRADES FOR BEATER, CALENDER AND TUB SIZING

CLINTON COMPANY CLINTON, IOWA

The Trade-Mark of

LONG LIFE FELTS

The Waterbury Felt Co.

SKANEATELES FALLS, N. Y.

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All Prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.00	@	4.25
Wool Tares, light	4.25	"	4.50
Wool Tares, heavy	4.50	"	4.75
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	4.25	"	4.75
Sisal Strings	*3.00	"	4.00
Mixed Strings	1.00	"	1.20

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.57½	"	—
Mixed Books	.85	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old Kraft Corrugated Containers	1.50	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	.85	"	—

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17¼	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila	—	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White No. 1	.07¼	@	.07½
New White No. 2	.04½	"	.05
Light Silesias	.04½	"	.04¾
Silesias, No. 1	.04	"	.04¼
Black Silesias, soft	.03¾	"	.04
New Unbleached	.07¼	"	.07½
Washable Prints	.03¾	"	.03½
Washable No. 1	.02	"	.02¼
Blue Overall	.04½	"	.05½
Cottons—According to grades—			
Washable shredding	—	"	.01¾
Fancy Percales	.03¼	"	.03½
New Black Soft	.02¾	"	.03
New Dark Seconds	1.75	"	2.00
Khaki Cuttings—			
No. 1 O. D.	.03	"	.03¼
No. 2 Mixed	.02¼	"	.02½
Corduroy	.01¾	"	.02¼
New Canvas	.04¾	"	.05¼
New Black Mixed	—	"	.02½

Domestic Rags (Old)

White No. 1—Repacked	3.80	"	—
White No. 2—Repacked	2.90	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
Sisal Rope	3.75	"	—
Mixed Rope	.75	"	1.00
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares, heavy	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Box Board Cuttings	.72½	"	—
Jute Corrugated Cuttings	.90	"	—
Overissue News	.85	"	—
No. 1 News	1.00	"	—

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½	@	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old Corrugated Containers	1.00	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	3.75	@	—
Sisal Rope No. 1	4.00	"	—
Sisal Rope No. 2	3.00	"	—
Mixed Rope	1.35	"	1.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.75	"	5.25
Jute Carpet Threads	3.25	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.75	"	4.00
Wool Tares—			
Foreign	(nominal)		
Domestic	3.75	"	4.00
Aust. Wool Pouches	4.75	"	5.00
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.50
Paper Mill Bagging	2.50	"	3.00
No. 2 Bagging	1.35	"	—*

* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	@	.04¾
Fancy Percales	.04¼	"	.05
New White No 1.	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06¼
Underwear Cutters, Bleached	.06¼	"	.06¾
Underwear Cutters, Unbleached	.05¾	"	.06
Silesias No. 1	.06	"	.06¼
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03¾
Corduroy	.03¼	"	.03½
New Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.06¼	"	.06¾

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—*
Miscellaneous	3.20	"	—*
White No. 2—			
Miscellaneous	2.65	"	—*
Twos and Blues, Repacked	2.20	"	—*
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—*
Miscellaneous	1.80	"	—*
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—*
No. 2	1.45	"	—*
No. 3	1.35	"	—*
No. 4	1.35	"	—*
No. 5, Quality A	1.35	"	—*
Quality B	1.20	"	—*
Quality C	.95	"	—*
* Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

(F. o. b Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices.

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—